JOURNAL OF MAMMALOGY

Published Quarterly by the American Society of Mammalogists

VOL. 8 NOVEMBER, 1927 No. 4

BREEDING HABITS AND EARLY LIFE OF THE THIRTEEN-STRIPED GROUND SQUIRREL, CITELLUS TRIDECEMLINEATUS (MITCHILL)[1]

BY OTIS WADE

[*Plate 23*]

Probably more has been written about the habits of the thirteen-striped ground squirrel than any of the spermophiles in North America, yet there are no exact records of certain important phases of its life history to be found. For instance the gestation period has never been more than estimated; the development of the young in the nest after birth, particularly as to the time when they acquire hair and open their eyes, has only been imperfectly known. So far as the writer can learn this information has been exactly determined through careful, painstaking observations for but one species, *Citellus columbianus*, by Shaw, whose studies on this western species have added greatly to our knowledge and can be applied in a general way to the life history of all members of the group. Yet there are interesting if not surprising variations, as will be shown later, among the different species.

The writer has been interested for several years in the phenomenon of hibernation common to many of our ground squirrels, and in pursuing a study of this habit has had the opportunity to get definite information on some obscure and unknown phases of the life history of *C. tridecemlineatus*. Of the three species found in this state, and which are being used in hibernation studies, this one is most plentiful and easiest obtained and therefore represents the bulk of those I have under close

[1] Studies from the Zoological Laboratory of the University of Nebraska, No. 153.

observation and on which I could make more than the superficial observations under field conditions.

Last spring I was fortunate in having four *tridecemlineatus* females, two virgins and two "old" individuals, mate in captivity with a male which had been captured a short time prior to the rutting season. Two of these females produced litters. A "virgin" gave birth to two young and an "old" female had ten. The other "virgin" died two days following copulation, death undoubtedly being a result of the act, and the second "old" female did not become pregnant.

BREEDING ACTIVITIES

In the vicinity of Lincoln the thirteen-striped ground squirrel appears from hibernation from about the middle of March to April 1. In 1926 the first ones were seen on March 17. However, it is some three or four weeks after emergence from winter sleep before the rutting season begins. As is commonly known, the earliest appearing individuals are preponderantly males.

The first two or three weeks are devoted to satisfying an appetite grown keen by a long fast, and to cleaning out and reconstructing burrows and building new nests in which to bring forth and rear the young. Breeding activities are at their height during the last two weeks of April; however, this varies with the season. Some mating occurs earlier, and undoubtedly some well into May. One observation, which has an important bearing on this point, is that the males are sexually active for only about two to four weeks in the spring, more commonly for two than four weeks. This appears to be the chief factor governing the rutting season for I have observed females on a number of occasions willing to mate, both before and after the males were sexually active—though in more cases afterwards—and in a few instances for some time after the males had lost the rutting impulse.

The following will serve as an example: On April 30, a male was put with an "old" female. They soon mated and the male was then segregated. The female did not become pregnant. As soon as the period of gestation had elapsed, she was put with five different males. In every case the female was willing to mate but none of the males was then sexually active and all refused to accept her, but instead were very belligerent and fought viciously when approached by the female in a friendly manner.

This habit of the male would seem to be in part responsible for the one litter a year rule; however, it has been noted in several instances that

females which had borne young would not again mate the same season and no cases are known where females have actually mated after having produced a litter that season. Of course all males are not sexually active simultaneously. Frequently males will be observed which have passed this stage while others have scarcely entered it. No doubt young males and late appearing ones constitute the latter group.

PERIOD OF GESTATION

Shaw gives twenty-four days as the gestation period for the Columbian ground squirrel, a much larger species than the thirteen-striped; and one would hardly expect the latter to require a longer time, yet the fact that it does require fully three days more is shown by the following observations and leads one to suspect that the smaller species of *Citellus* probably all have a longer gestation period than the larger ones.

On April 17, 1926, a young female, known as No. 7, mated with an "old" male, No. 8. This occurred about 2:00 p.m. and they were in copulation about ten minutes. The male was segregated the same afternoon. At 8:30 on the morning of May 15 two young were found in the nest which was scattered and disarranged, and since the mother paid no attention to the young and appeared somewhat sick, I presumed that the young had only recently been born, probably early that morning. When last inspected, the previous night at eight o'clock, there were no young but the female showed unmistakable signs, by carefully building up and arranging the nest and by her uneasiness, that young were soon to arrive. The young were naked, blind and perfectly helpless, much as young mice or rats. The two weighed 6 grams. When I returned at 11:00 a.m. to note conditions the young were gone and the nest was scattered about while the female sat dozing in one corner of the cage. There was but one conclusion,—she had devoured them.

On April 24, 1926, at 4:00 p.m. the same male, No. 8, was put with an old female, No. 6. In a very short time they mated, and the male, in less than an hour, was again segregated.

The morning of May 22 at eight o'clock ten young were found with this female. Inspection was last made the previous night at 9:30 and no young had yet arrived. Their total weight was twenty-six grams. Four days later, on the twenty-sixth, when removed for photographing, only nine could be found. Evidently the female could not resist the little pink "morsels" and ate "just one." Except for this one lapse she made a good mother and attended them carefully until they were able to care for themselves.

The gestation period for the species as definitely noted in these two instances is between twenty-seven and twenty-eight days, or practically a lunar month, as indicated in table 1. Wood gives the time as "about one month" for *tridecemlineatus*.

TABLE 1

FEMALE	DATE OF MATING	DATE OF BIRTH
No. 7	April 17—2:00 p.m.	Between 8:00 p.m. May 14 and 8:30 a.m. May 15
No. 6	April 24—4:00 p.m.	Between 9:30 p.m. May 21 and 8:00 a.m. May 22

TABLE 2

DATE	NUMBER OF YOUNG	TOTAL WEIGHT
		grams
May 22	10	26
May 26	9	70
May 28	9	86
May 30	9	99
June 2	9	124
June 3*	9	130
June 5	8	124
June 6	8	126
June 9	8	134
June 11	8	137
June 13	8	146
June 15	8	150
June 17	8	153
June 19	8	155
June 22	8	155
June 24	8	153
June 26	8	169
June 28	8	179
June 30	8	195
July 2	8	211

* On June 3 one was sacrificed for the purpose of studying the pigmentation in the skin.

GROWTH OF YOUNG

The young develop rapidly. At first they are perfectly helpless and dependent entirely on the mother for care and protection. When they

inadvertently roll out of the nest on occasions when squirming restlessly or are dragged out by the mother, hanging to her breasts, she picks them up in her mouth about their middle and carefully puts them back in the nest. After a few days, when they are getting too big for her to do this conveniently, the takes them by the shoulders or neck, or perchance by a foot, and partly carries and partly drags them back into the nest. Fortunately they soon are able to use their front legs (in about twelve days), which become strong and usable long before the hind ones, and then they are able to crawl back into the nest, or out of it as they sometimes do.

When eight days old the back has become very dark, almost black in contrast to the pinkish color of the underparts. On the twelfth day the characteristic stripes can be seen plainly, and downy hair is scattered over the head, shoulders, and back a little way along the sides; and on the thirteenth day the entire body is thinly covered with hair, quite sparsely, however, on the hind portions. This agrees with the time Shaw records for the Columbian species. Both Washburn and Wood state the young of *tridecemlineatus* are without hair for "about three weeks."

On the twelfth day the peculiar "call" or "trill" common to ground squirrels can be heard when the young are disturbed Prior to this the sound made by them is scarcely more than a squeak.

By the twentieth day they are using their hind legs some but are still blind and so grope their way slowly about. When twenty-six days old their eyes begin to open, at the anterior corners; this is a process requiring one and sometimes nearly two days. Some did not have their eyes fully open until they were twenty-eight days old. According to Shaw the Columbian ground squirrel begins to open its eyes when seventeen days old.

The rate of growth for this particular litter is given in the table of weights for the first six weeks of their lives or about the time they are confined to their subterranean home and dependent largely on the mother for their existence (see table 2).

About June 19 or 20 the female had apparently started to wean the young, as will be seen by the weights, and for about a week they did not gain; in fact from June 22 to 24 there was an actual loss of two grams. As soon as they had learned to eat sufficiently well they began to gain steadily again. They were aided at this time, June 24, by being given small bits of bread and butter, which no doubt helped them to a more rapid recovery from the loss of nursing. At first they were unable to

sit up in the characteristic manner and eat while holding the food with the front feet, but had to rest the food on the ground while grasping it. After a few days they had learned to balance themselves by repeated efforts and could sit up quite well.

Robert Kennicott wrote concerning this species as follows: "The young are produced at the end of May or early June. I have observed from five to nine brought forth at a birth, and I am informed of two instances in which ten were found in a nest; but the number is variable, the usual number being six or seven. The young at birth are naked, blind, and remarkably embryonic. Dr. Hoy, who has observed them in confinement, says that they have no hair on the body before they are twenty days old and the eyes do not open until the thirtieth day. They continue to require nourishment and care of the mother for a much longer period than most rodents. During the summer they begin to dig shallow burrows and leave her before winter to shift for themselves."

Field observations made continually throughout the spring and early summer of 1926 showed young squirrels above ground by July 1, and actively engaged in excavating burrows for themselves and living a more or less independent life. On July 10 one young squirrel about one-third grown was noted in an isolated place with no others immediately near. It had already established its abode and had two holes about a rod apart, into which to retreat. These it had excavated itself, I presume, for they were smaller in diameter than the burrow entrances made by adults. On the same date about 5:00 p.m., in another locality, a group of six young was seen busily feeding and playing about. When approached they sat up, rather closely bunched, and watched me until I came quite close; then each scampered to its own burrow and darted in only to reappear in a few minutes. On closer observation some ten or twelve of these "juvenile" burrows were seen in close proximity to the old burrow, which none of the young had used in seeking safety. None of the entrances to these dens made by the young measured more than an inch in diameter. The young were small, probably about seven or eight weeks old, judging them by those in captivity, since they seemed to be virtually the same size. No adults were seen in the immediate vicinity.

On July 31 two young males were trapped alive. One weighed 106 grams and the other 148 grams. The summer weight of most adult males is between 160 and 180 grams.

Fig. 1

Fig. 2

Fig. 3

FIG. 1. YOUNG GROUND SQUIRRELS (CITELLUS TRIDECEMLINEATUS) FOUR DAYS OLD

FIG. 2. NINETEEN DAYS OLD. FULLY CLOTHED WITH HAIR BUT EYES STILL CLOSED

FIG. 3. THIRTY-ONE DAYS OLD. EYES OPEN AND ACTIVE BUT STILL CONFINED TO THE BROOD CHAMBER

SUMMARY

1. In the region of Lincoln, Nebraska, the rutting season of *Citellus tridecemlineatus* extends over a period of about a month and corresponds roughly to the month of April, breeding activities being at their height the last two weeks of that month.

2. The rutting impulse of the males occurs only in the spring some three or four weeks following emergence from hibernation and lasts for a period of two to four weeks, more commonly for the shorter time. At this time the testes are much inflamed and swollen.

3. After having produced a litter, females are not known to breed a second time the same season. In all cases observed females have refused to mate after having given birth to young.

4. The rutting impulse of the female appears to last for a longer time than it does in the male provided the female does not become pregnant in the meantime.

5. The gestation period is practically a lunar month,—between twenty-seven and twenty-eight days.

6. The characteristic stripes are distinct, and the anterior portion of the body, at least, is clothed in downy hair when the young are twelve days old.

7. At twelve days of age the young make the typical ground squirrel "call" or "trill" when disturbed. The fore legs can also be used at this time for locomotion but the hind legs can not and the posterior part of the body is simply dragged along.

8. When twenty days old the hind legs are strong enough to support the hind parts and the young squirrels can walk.

9. The eyes begin to open when the young are twenty-six days old and are fully open by the twenty-eighth day.

10. The young squirrels can take care of themselves when about six weeks old.

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PRELIMINARY EXPERIMENTAL STUDIES OF MICE OF MOUNT DESERT ISLAND, MAINE

BY BEATRICE W. JOHNSON

INTRODUCTION

The object of this experiment was to determine the distribution, range, and retrapability of species of mice in certain defined regions on Mount Desert Island, near Bar Harbor, Maine. Inasmuch as small mammals had never, in so far as was known to us, been retrapped over and over again, it seemed desirable to find out whether this would be possible.

The duration of this experiment was from the June 23, 1924, until August 25, 1924. Thus the time at which the work was done coincided with the dry season on Mount Desert Island.

It should be stated that at best only a beginning of this work could be made during the first summer. Whether or not the same mice trapped this summer could be recaught during a subsequent summer, and whether the range or environment would be radically changed, are only a few of the interesting phases which will require the cumulative results of at least several summers' trapping. As a result of this season's work, many improvements in the way of trapping technique have suggested themselves for use in the future.

In picking trap locations, and in becoming generally informed about definite areas, a manuscript[1] on the vegetation of Mount Desert Island,

[1] "Vegetation of Mt. Desert Island, Maine, and its Environment" by Barrington Moore and Norman Taylor, Brooklyn Botanic Garden Memoirs, vol. 3. Awaiting publication.

the work of Moore and Taylor, and kindly loaned to us by them, was of invaluable assistance.

MATERIAL AND METHODS

Two styles of wire traps were used, and were found to be of approximately equal value. One style was oval shaped, having two compartments separated by a horizontal hinged platform which was tipped downward by the weight of the mouse, thus allowing the animal an entrance into the back of the trap where it was imprisoned; the platform tipped back to its original position as the mouse stepped off. This type of trap is the well known French mouse trap. The other type was dome-shaped, with a hole at the top bordered with narrowing wires headed into the trap. Thus entrance was permitted, but exit against the pointed wires was impossible.

The traps, when set, were slightly wedged into the humus, baited with dry oat meal, and covered with dead leaves, which could be pulled into the trap by the mice and serve as protection from the cold. In picking locations for the traps, an attempt was made to place them near what seemed to be mouse holes or runways. Three general types of location were utilized as trapping areas:

(1) Dry regions: of low moisture content and high soil evaporation.

(2) Regions of moderate or average water supply (such a region would be typified by a preponderance of forest land).

(3) Low levels or damp swampy regions near ditches or natural drains where soil evaporation was comparatively low and moisture content high.

Regions chosen as trapping areas

The dry regions chosen were (1) a pitch pine area on the southern slope of Pickett Mountain (Huguenot Head), at an elevation of approximately 625 feet, (2) a white pine area on Bear Brook Hill, and (3) a spruce stand at Otter Cliff.

The pitch-pine area is a stand consisting largely of pitch pines (*Pinus rigida*), has direct exposure to south winds, is rocky, somewhat barren, and has no water supply except the rains which are slight during the summer season when the trapping was done. Because of the lack of moisture, the vegetation is stunted and sparse. This phase is extensively discussed in the paper of Moore and Taylor above referred to.

The white-pine region is a stand where white pine (*Pinus strobus*) dominates, and the soil is a light, porous, stony loam. The forest

floor is covered with dry needles and has very little undergrowth on it.

The Otter Cliff region is at the top of a rocky ledge only about 300 feet back from the sea. Spruce trees (*Picea alba* and *Picea nigra rubra*) form the great majority of the trees in this region. Although near the seacoast and thus presupposedly damp, this region, according to Moore and Taylor, is dry because of the fact that as the fogs blow in from the sea, they condense the water in the air and sweep inland leaving the atmosphere dry by removal of the water vapor.

The area chosen as typical of an intermediate condition of moisture was a section of Newport Mountain. Here one finds a stand of mixed conifers: red and white spruce, hemlock, fir, and red pine, with here and there a few birches and an occasional maple. The floor of this region is composed of rich, dark, heavy soil, which, as it accumulates, increases the moisture-holding capacity of the region. The woods are moderately damp because of the fact that very little sunlight sifts through the trees, and also because of the water trickling down the mountain sides.

The areas chosen as typical moist regions were (1) in red oak (*Quercus rubra*) woods, and (2) a meadow adjoining these woods. This region is situated close to the precipices which form the southeastern face of Newport Mountain, and between that mountain and the shore drive. According to Moore's calculations, these woods are damp and have a low evaporation coefficient due to the fact that there is a very rich layer of decayed organic matter on the forest floor. The trapping site chosen in the meadow is also damp because it follows the course of a ditch which, even in the driest season, was never entirely without moisture.

When mice were caught, the ears were marked with a metal chicken-punch (the type used to mark between the toes of day old chickens) and the mouse was then set free. Thus in the event of retraps, identification and record were possible. The key used in marking the mice has been found successful in the case of thousands of house mice bred in the laboratory.

RESULTS

Species of mice trapped

Three species of mice were caught:

1. *Microtus pennsylvanicus pennsylvanicus*, or the common meadow mouse. This species is dusky brownish in color with small ears and eyes.

The average total length of an adult is six and three-quarters inches. These mice live in meadows where there is tall grass at the base of which they make their runways on the ground.

2. *Evotomys gapperi ochraceous*, the red-backed mouse. This species is rich chestnut brown in color, with a black-ticked redder streak down the back. This reddish streak gives it the common name of red-backed mouse. The average total length of an adult of this species is five and three-quarters inches (smaller than the meadow mouse). These mice have no runways above ground.

3. *Peromyscus maniculatus abietorum*, the deer mouse, is a greyish fawn color dorsally, and has a white belly and white feet. Its common

TABLE 1

EVOTOMYS (RED-BACKED MICE) TRAPPED		PEROMYSCUS (DEER MICE) TRAPPED		MICROTUS (MEADOW MICE) TRAPPED		TOTAL NUMBER TRAPPED		TOTAL NUMBER TRAP NIGHTS*
Males	Females	Males	Females	Males	Females	Males	Females	
22	8	11	6	5	1	38	15	1,473

* To obtain the "trap nights" the number of traps in a certain region was multiplied by the number of nights they were left in the region.

TABLE 2

EVOTOMYS RETRAPPED		PEROMYSCUS RETRAPPED		MICROTUS RETRAPPED		TOTAL NUMBER OF RETRAPS	
Males	Females	Males	Females	Males	Females	Males	Females
49	9	30	17	0	0	79	26

name, deer mouse, comes from the fact that it is colored much like the Virginia deer. These mice have large eyes and ears, and are by far the most delicate and attractive of the three species.

For further detailed descriptions of these species, an excellent account is given in volume one of "Life Histories of Northern Animals" by Ernest Thompson Seton.

Number of mice caught

Table 1 shows the number of mice caught.

It will be observed that there is a significant excess of trapped males over trapped females.

Retrapability

Table 2 shows the total number of retrapped animals which were identified by earmarks, and their range noted.

It is interesting to note that *Peromyscus* (deer mice) and *Evotomys* (red-backed mice) could be retrapped over and over again. One mouse was retrapped sixteen times, and others approached this record. The *Microtus* (meadow mice) seemed to be much more wary or timid, for no retrap of this species was ever obtained. It must be realized, however, that fewer *Microtus* were originally trapped; therefore there is a possible numerical weakness in these data. But is not this very weakness a bit significant, for evidently this species was more difficult to trap even a first time. Unlike other regions where there was a more or less constant supply of mice for the traps, the meadow region, after the first trap-week when six mice were caught, yielded no further mice.

There was a distinct difference in the behavior of *Evotomys* and *Peromyscus* in the traps. As above stated, after the trap was baited, dead leaves were piled over it, partly to conceal the trap from other animals and partly to serve as warmth or protection to imprisoned mice. *Peromyscus* pulled these dead leaves into the trap and thus managed to keep fairly warm by being less exposed. *Evotomys*, however, did not usually pull in the leaves, thus were exposed in the bare wire traps, and often died before the rounds of the traps were made in the morning. Eleven *Evotomys* perished in this way, whereas only three *Peromyscus* were found dead from exposure.

There is a possibility that the greater mortality of *Evotomys* was due to the fact that they were exposed in the trap a longer time or are more sensitive to the cold than are mice of the genus *Peromyscus*. In either case, their pulling in leaves for protection would have helped.

Another difference in behavior between *Peromyscus* and *Evotomys* was noted. When mice of the genus *Peromyscus* were released from the trap they seemed in no hurry to return to their abodes, often stopping to eat a grain or two of oat meal, or to clean their vibrissae. On the other hand, *Evotomys* were noticeably more timid, scampering off post-haste.

Moisture correlations

Tabulating the data under the headings of "dry," "intermediate," and "damp" trap-sites (classifications based on scientific readings of evaporimeters by Mr. Moore), the results given in table 3 were obtained.

Although the number of mice caught is not large, there is a strong indication that a larger number of mice are found where there is available moisture. Lumping the damp and moderately damp regions, on the basis of the fact they both have available water supply, gives the data in table 4. It should be noted at this point that the moisture factor is much more likely to influence the distribution and range of wild mice than is the food factor. This is due to the obvious fact that food can be moved and stored, and water can not.

During the study of the influence of moisture, it was observed that in dampest trap regions as, for example, along a ditch, there seemed to be a replacement of the red-backed mice (*Evotomys*) by the mole-shrew (*Blarina brevicauda*). The habitats of *Blarina* and of *Evotomys* overlap, and there is probably a struggle for survival between these two species.

TABLE 3

	TRAP NIGHTS	NUMBER OF MICE CAUGHT	PER CENT
Dry region	406	2	0.49
Moderately damp regions	583	27	4.63
Dampest regions	484	24	4.95

TABLE 4

	TRAP NIGHTS	MICE CAUGHT	PER CENT CAUGHT
Dry regions	406	2	0.49
Damp and intermediate regions	1,067	51	4.77

Another factor in connection with the amount of moisture should be mentioned. Attempts to trap mice along a brook bed were unsuccessful. This seemed peculiar at the time, but a cloudburst which flooded the brook banks and would have drowned the mice in their burrows, showed us why a mouse would not be adapted to chose such a spot for its home.

Range

The range of the experimental animals was necessarily obtained from retrap records. Usually the individual trapping areas included about seventy-five yards, and it was perfectly evident that the mice moved about freely within the boundaries of an area of this size.

One mouse, male no. 12, *Peromyscus*, was a distinct exception to this rule, and is interesting to note. Its home was in a mixed conifer forest at an elevation of about 250 feet on the slope of Newport Mountain. There it was originally trapped and retrapped fourteen times. One morning, however, it was found in a trap near the top of Pickett Mountain which at a conservative estimate is at least one-quarter of a mile up the mountain and necessitated the crossing of two dried-up brook beds between the adjoining mountains.

Whether or not this range is unusual can not be ascertained without further experimentation, but at all events it is interesting to note at this time, for Seton in the volume above mentioned, says that the range of a deer mouse is "confined within 100 yards." Here is at least one variant.

TABLE 5

REGION	PEROMYSCUS TRAPPED	EVOTOMYS TRAPPED	MICROTUS TRAPPED	TOTAL TRAPPED
Highest altitude	4	1	0	5
Intermediate altitude	15	12	0	27
Lowest altitude	0	15	6	21

Correlation of altitude with species trapped

These data are given merely as a matter of interest rather than as conclusive proof of the phenomenon recorded.

At the highest altitudes studied (625 to 675 feet above sea level) there was an excess of *Peromyscus* over *Evotomys* trapped. On Pickett Mountain four deer mice were caught, but only one red-backed mouse. These numbers are so small, however, that they are thoroughly inadequate as conclusive evidence and serve merely as a hint for further investigation.

At regions 150 to 250 feet above sea level both *Peromyscus* and *Evotomys* were caught in practically equal numbers.

At the lower altitude (about forty feet above sea level) a distinct excess of *Evotomys* and *Microtus* was noted, for not a single *Peromyscus* was caught. (See table 5).

Though there is undoubtedly some correlation between altitude and moisture, it should be noted here that these factors could not be grouped together and results tabulated under one heading, because a region selected for trapping might be high but not dry. The east and north-

east sides of Pickett Mountain are examples of this sort. For this reason a separate treatment of moisture and altitude was believed to be necessary.

Peromyscus and *Evotomys* were both trapped at the region of 150 to 250 feet above sea level, but the two species were never caught at the same time in the same trap. Often two *Peromyscus* or two *Evotomys* were caught in the same trap at the same time. The failure to trap the two species at the same time in the same trap, tends to suggest that although they live in the same region, mice of the two species do not associate with each other closely.

It might be suggested by some that if a mouse of each genus were caught in a trap at the same time, one might eat the other and the fact would never be known. This would be impossible, however, for mice do not eat each other's vertebral column or tail, and therefore traces of a battle would remain.

Time of activity of mice

Data concerning the time of activity of wild mice have not been entirely satisfactory. For example, Seton in "Life Histories of Northern Animals" states that *Peromyscus* is nocturnal. This is not always the case, however, for *Peromyscus* and *Evotomys* have been found in traps outside of their burrows at five o'clock in the afternoon, when they were not in the traps at eight-thirty in the morning. This clearly shows that the mice are active in the daytime as well as at night.

Introduction of a strange animal into a community

This experiment at present involves only one animal, but it seems worth mentioning at least. A female *Peromyscus* (number 21) was caught in a student's tent at the Biological Station. With a view to determining whether or not this animal would be accepted in a strange community, it was marked and set free in the trapping area of Newport Mountain woods. Evidently it *was* adopted by the community, for it was retrapped eight times in three weeks in that region, and seemed in good condition each time.

CONCLUSIONS

1. Small mammals can be retrapped and thus their range, distribution, or other factors studied.

2. *Peromyscus maniculatus abietorum* and *Evotomys gapperi ochraceous*

can be retrapped over and over again. No *Microtus pennsylvanicus* were obtained as retraps.

3. A female *Peromyscus* can be introduced into a strange community and survive.

4. There was a significant excess of trapped males over trapped females.

5. Mice trapped on Mount Desert Island were so distributed as to coincide with the presence of available moisture.

6. Of the three species trapped, it is suggested that *Peromyscus maniculatus abietorum* (deer mouse), lives in the higher altitudes (approximately 700 feet). At intermediate levels (150 to 250 feet above sea level), there was an overlapping of this species with *Evotomys gapperi ochraceous* (red-backed mouse). At the lowest trap regions (40 feet above sea level) only *Evotomys* and *Microtus* (meadow mouse) were found; the former at times in competition with the mole-shrew, *Blarina brevicauda*.

7. Inasmuch as they were found to enter the traps in the daytime as well as at night, *Peromyscus* and *Evotomys* are both diurnal and nocturnal.

8. Because of the fact that many males were caught in the same small region, and even two in a trap at once, it seems likely that within a region each genus has its own community life instead of being divided into small monogamous families.

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SOME FLASHLIGHTS OF NEW MEXICO MAMMALS

By Tappan Gregory

[*Plates 24–28*]

Vermejo Park, New Mexico, is the headquarters of a cattle ranch, comprising in the neighborhood of 350,000 acres. The elevation at the park itself is about 7500 feet and the country stretches away up the valley of the Vermejo, a fertile meadow land, flanked on both sides by mesas and foothills of increasing height, rising eventually to the valley of the Costilla. This stream comes down from the hills in two branches which traverse the floor of the valley, a distance of perhaps five miles, there emptying into a reservoir to flow out again below the dam into more rugged country.

On a slope above this valley and twenty-four miles from the ranch headquarters, there is a frame bungalow at an elevation of 10,300 feet. Vermejo Park is in Colfax County, but within the boundaries of the ranch is included a portion of Taos County, where the bungalow is situated at the foot of the easterly slope of the Culebra Range. The snow-capped peaks of this range rise to an altitude of about 14,000 feet and across the valley Costilla Peak stands alone, reaching to a height of about 12,700 feet.

Clinton Merrick, of Chicago, and I, with our host, Sterling Rohlfs, arrived at the Costilla bungalow in the morning of June 30, 1926. We stayed under cover long enough to dodge a heavy rain and hail storm in the forenoon and then wandered back among the hills to make a preliminary reconnaissance before setting out our camera. We came shortly upon a series of three or four beaver ponds and were fortunate enough to catch sight of a large member of the colony before it saw us. It swam around in a leisurely way for some minutes, approaching a log which lay in the shallow water, nibbling at it for a moment and then crawling out on dry land, where it sat up and rubbed its face thoroughly with both fore paws, scratched its stomach a bit and slid back into the water. Its course took it down the pond, over the face of the first dam, which was about six feet high, across the next pond below and down that dam into a third pond. At this point it was more or less out of our line of vision and we moved on, hearing the resounding whack of the beaver's tail as it dived at the first suggestion of motion on our part. This was at about half past four in the afternoon. Half an hour later, a distant coyote wailed dismally. We decided to make our set by an occupied

beaver house on one of another series of ponds within ten minutes' walk of the bungalow. These ponds we estimated to be about two hundred feet higher than our camp. Considerable preliminary work had been done by this particular colony of beavers before they finally settled on the location of their permanent abode. The general situation was quite ideal as the hillsides were densely covered with aspen, providing food for a large number of beavers for many years to come. Three distinct dams were constructed, the first one, not particularly substantial, making a pond which apparently served ultimately as a sort of reservoir to insure a good supply of water. From this first and upper pond a canal about fifty feet long was dug and the water let through into a depression at that time practically dry. At the lower end of this depression another dam was constructed, but it proved unsatisfactory for some reason, perhaps because it did not appear to contain the water well enough, and above it, the third and final dam was placed. This latter construction was about 140 feet long by rough measurement with a tape and of an estimated height of five feet. At the upper end of the final pond, which lay between the other two, the beavers made their house. We measured it as well as we could and found it to be about twenty-three feet long, fifteen feet wide and four feet high. On one side of it we found a well worn runway which had been recently used and here we made our set, training the camera so that a beaver using this runway would strike the trip wire about two feet and seven inches from the water. We completed our preparations shortly before seven in the evening and left a little beaver musk by the trip wire on the side of the house. As we came away, a very small beaver appeared. It spent several minutes resting on some under-water branches of a tree near the bank and then swam off out of sight. While we were making the set, it rained a little and an hour or so later considerable more rain fell and continued until about ten o'clock. The thermometer at that time stood at 50°F.

The next morning at eight o'clock we found our trap sprung and fresh beaver tracks on the runway on the side of the house, made since the rain. Some of the claw marks were deep in the mud and this, together with the fact that the trip wire was unbroken, indicated that the animal had turned back into the pond at the flash. We had heard the coyotes again in the early morning and looked around that afternoon for some place to which to tempt them with beaver musk. It seemed worth while too to put out a little catnip on the chance that a cat might stray that way, but this was the rainy season and a heavy

thunder storm with soaking rain and some hail, lasting several hours at supper time, probably successfully eliminated any chance which there may have been of attracting anything to our bait. Coming in our circuit to the camera at five o'clock, we found it sprung but no fresh tracks to support the hope of a beaver. As a matter of fact it developed that a small song bird had lit upon the wire with sufficient force to fire the flash. We reset it, of course, but found no change in it the next day except that the hail had broken through the single layer of tinfoil which covered the flash powder and permitted rain to come in and soak and cake the powder and make it useless. Thereafter we used two layers of tinfoil and this sufficed to protect the powder against the heaviest rain to which it was subjected. On the way to the set that morning we came on a large growing aspen which had been clawed quite thoroughly to a height of a couple of feet from the ground. The bark was stripped, deep claw marks left in the wood and the ground at the base of the tree mussed up. All of this had been done since the preceding evening. Probably a cat had been there. Two hours of light rain in the forenoon made it advisable to check up on the condition of the flash powder, so we looked at it shortly before dusk and found that the tinfoil had served admirably. While we sat looking at the pond, a large beaver swam into view, headed for the house. Just off the end of the house the tops of two aspens slanted out of the water and into these the beaver swam and through them to within a few feet of the house, inspiring the hope that it might crawl up onto the runway and permit us to watch it take its own picture. But at this point it dived and apparently entered the house. We had the impression that the trunks of the two slanting aspens constituted a portion of the foundation of the house and that the entrance came out under water between them. At noon of July 3, we found evidence that the beaver had climbed on the house again across the trip wire. The wire was broken this time and a peeled branch had been left on the runway. The picture shows a beaver in the act of carrying this branch with some other twigs.

There followed an interval of several days when the camera was not in use and it was the tenth of July before we set again for beaver on the pond near the Costilla. The set was completed about noon and this time the face of the dam was chosen where there was a distinct slide, apparently used quite regularly by the beavers. While we were working, a little rain fell and considerably more later on. We did not put in the charge of powder until about seven o'clock in the evening. At that time we heard one of the beavers splashing in the pond and others,

presumably young ones, in conversation in the house. At eleven o'clock that night the trip was still untouched. More rain fell but did us no damage and we found the next morning that another picture had been taken. The wire was unbroken but badly sagged and the slide looked as though a beaver had recently been on it.

On the thirteenth we made a set in a canyon near the headquarters, baiting with raw meat and attaching the meat to the main trip wire by means of an additional short length of wire. Nothing came near the camera that night, however, nor the next day, but on the morning of the fifteenth we found it sprung and the bait moved slightly out of place. There were no tracks visible and the pine needles had not been sufficiently disturbed to indicate the presence of a mammal of any size. As a matter of fact, it was a white-footed mouse (*Peromyscus maniculatus rufinus*) which had taken its picture. The distance from the bait to the camera being about twelve feet, the subject was not as distinct and detailed as could be desired. Some day I am going to set the camera especially for mice at a distance of three or four feet. After this last picture we did not reset until five o'clock in the afternoon and fifteen minutes later heard the report and saw the smoke from the flash sifting up through the trees. As might be expected, a bird was responsible, having struck the wire quite by accident in its flight.

Our next effort was on the upper reaches of the Vermejo where the stream comes through a gap in what is known as the "Stone-wall,"—a curious wall-like formation of Dakota sandstone which extends through miles of that part of the country, rising sheer in places several hundred feet. We camped at the foot of the wall at an altitude of about 8500 feet and put the camera out two or three hundred yards upstream from camp and perhaps twenty-five feet or so from the water near a rocky ledge. It was baited again with raw meat. Near the set were some fresh coyote tracks in a trail which more or less followed the course of the river. At a few minutes after eleven that night, July 16, we heard the report of the flash, but when I went to reset, I could find no indications of what had sprung it. Development showed once more a mouse, this time a back view. That night for the first time, we had no rain, and the ensuing three or four days were also beautifully clear. In the morning we found fresh cat tracks in the wet sand near the river, a hundred yards or so above our set, but the flash had not gone off. At noon I heard it again and once more saw the smoke. The only suggestion of what might have set it off was found in the presence of a chipmunk scampering about near the bait when I arrived on the scene.

UPPER. BEAVER CANAL BETWEEN UPPER AND LOWER PONDS
LOWER. THE CAMERA-SET AT BEAVER HOUSE

UPPER. BEAVER DAM SHOWING CURVED CONSTRUCTION
LOWER. FACE OF DAM ON WHICH BEAVER WAS PHOTOGRAPHED

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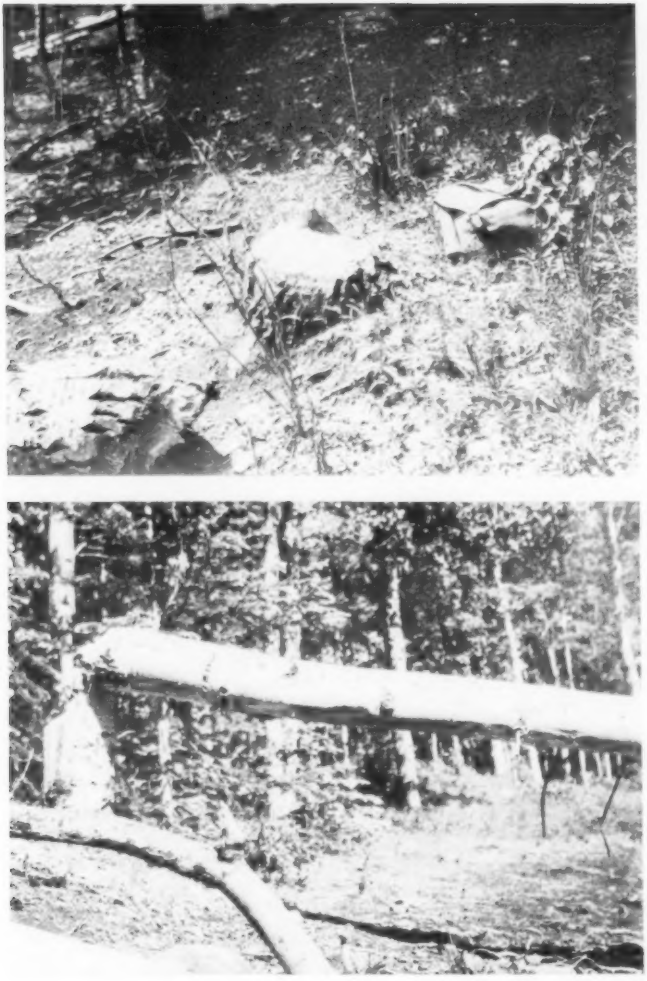
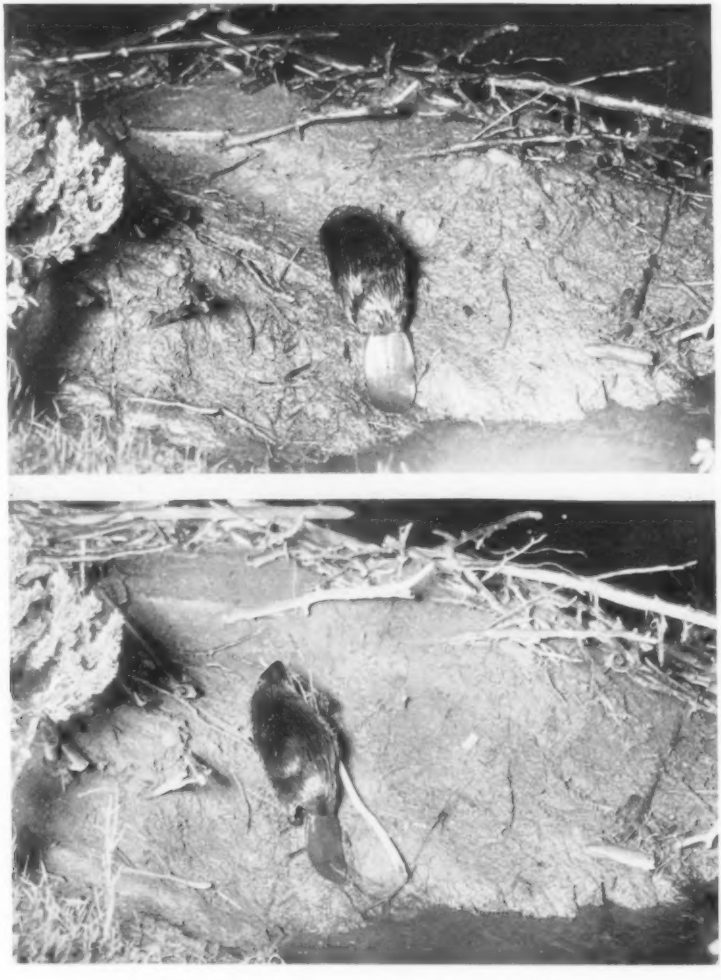


UPPER. ASPEN 16 INCHES IN DIAMETER CUT CLOSE TO GROUND
LOWER. FALLEN ASPEN SHOWING HOW BARK WAS EATEN FROM THE UNDERSIDE BY BEAVERS



UPPER. FIRST PICTURE OF BEAVER ON HOUSE
LOWER. BEAVER CARRYING PEELED STICK AND TWIGS UP SIDE OF HOUSE

UPPER. BEAVER COMING DOWN FACE OF DAM
LOWER LEFT. WHITE-FOOTED MOUSE AT MEAT BAIT
LOWER RIGHT. MULE DEER ON TRAIL

UNIV OF MICH

He did prove to be the cause of the trouble, but the responsibility was mine because in stretching the trip wire I led it across a log and fastened it to a small sapling in the background and the chipmunk tripped it while running down this log. We moved the camera that night some little distance above the first position and set it across the stream from the game trail. Early in the evening it was sprung again, but we never could be certain from the picture just what did set it off, the best conjecture being that a branch floating down stream, too close to the camera to be in the picture, was responsible. Nothing more came near it that night, though we heard coyotes at about 9:30. Six nights with a trail set in a canyon about a mile and a half from headquarters yielded only one picture, that of a mule deer taken on the night of July 20. We had chosen this place because of cat and coyote tracks seen on the trail and we did see one more fresh track of the latter after making the set, but none crossed the wire. I saw three of these animals during my stay in that part of the country and on the way out we jumped a cat, but it requires more time than we had, patient pursuit and much care to induce either cat or coyote to take its own picture.

Chicago, Illinois.

HORNED DOES

By Joseph Dixon

[*Plates 29–30*]

Normally only the males of the Rocky Mountain mule deer (*Odocoileus hemionus hemionus*) bear antlers, but females of the species, with horns, have been reported from time to time by woodsmen and hunters. It has been impossible to obtain complete evidence in these reported cases, because at best only the mounted heads or horns were preserved, there being consequently no proof kept of the sex of the animal.

Through the thoughtful interest of officials of the United States Forest Service and of the California Fish and Game Commission, together with that of certain sportsmen, the Museum of Vertebrate Zoology of the University of California has been presented within the past fifteen months with three specimens of Rocky Mountain mule deer, undoubted females, each with well developed horns.

The first of these three antlered females (Mus. Vert. Zool. no. 35,326) was received at the museum on September 14, 1925, having been sent

in by district ranger H. I. Snider of Truckee, California. This deer was killed by W. D. Johnson, on September 11, 1925, at a point approximately 4 miles east of Sierraville and 26 miles northwest of Truckee. In letters of September 12 and 30, 1925, Mr. Snider states, wording his own: "I saw the cleanings of this deer and know that it was a doe with horns. The general appearance of the animal was that of an extra large doe with horns. The hoofs (see fig. 1) I thought were rather large for a doe, however; this deer weighed 160 pounds [dressed]. The shape of the head and neck were very much like that of a normal doe. The bladder and urinary organs appeared normal. Hunters who killed does in olden times and who saw this female state that they believed she had never had a fawn. Her nipples were about the same size as those of a buck."

The entire skin of this doe, together with the head and attached horns were sent to the museum. The fresh skin showed conclusively that the animal was a female. The tail (see fig. 2), which measured 7 inches in length exclusive of hairs, was that of a typical mule deer. The horns of this doe were gnarled and malformed, and they were still in the velvet on September 11 when the animal was shot for a buck. There is no indication that the velvet would have been shed at all. In many respects the antlers were similar to the horns of certain castrated bucks on record, in which the antlers are always in the velvet.

The second horned doe was brought to our attention through J. S. Hunter of the California Fish and Game Commission. This deer (Mus. Vert. Zool. no. 36543) was shot by Oscar T. Schumacher, on September 29, 1926, in virgin timber 7 miles south of Truckee, California, and about 1½ miles from the Truckee River. This doe was one of a band of six deer, consisting of one buck, three does, and two fawns. In letter of October 6, 1926, Mr. Schumacher states: "This doe was in first-class condition, fat and well built, weighing 150 pounds dressed." The head (see fig. 3) is similar to that of an average forked-horn buck of this species. The antlers are of fair size (see table) and have well developed brow tines low down near the bases of the antlers. When shot, September 29, 1926, the horns of this deer were completely out of the velvet, being brown and hard like those of an ordinary buck. The fresh skin of this specimen showed beyond question that it was a female deer. Measurements taken in the flesh at the museum are as follows: tail, 7⅝ inches (195 mm.); hind foot, 14½ inches (370 mm.); ear from crown, 7⅞ inches (200 mm.); hoof of front foot, 2¼ inches long, 1¾ inches wide; hoof of hind foot, 2⅝ inches long, 1¾ inches wide; length of metatarsal gland, 4¾ inches.

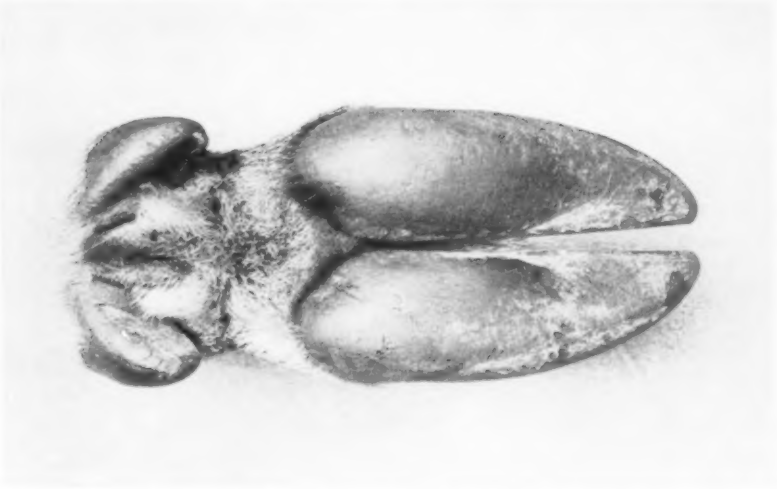


FIG. 1. RIGHT FRONT FOOT OF OLD HORNED DOE NO. 35326, NEARLY NATURAL SIZE
Actual width of hoof, two inches

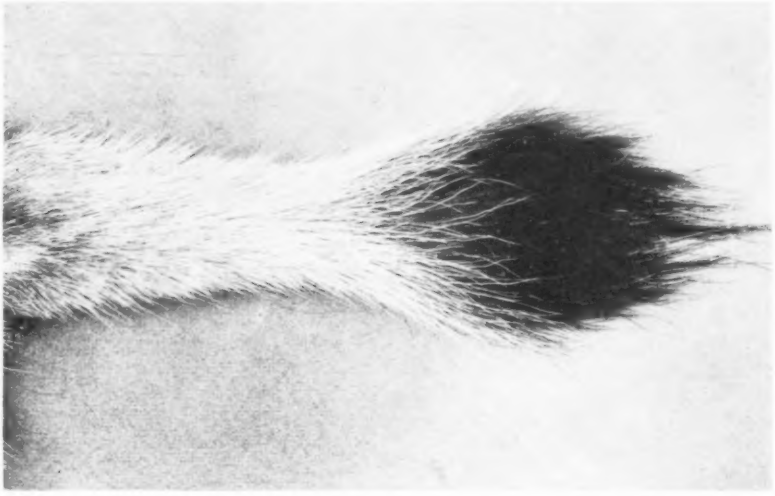


FIG. 2. TAIL OF OLD HORNED DOE NO. 35326, x ½

In typical mule deer the black of the tail is restricted to the terminal half of the tail as here illustrated. Where mule and coast black-tailed deer intermingle in California we find specimens with a broad black stripe extending clear to the base of the tail.

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FIG. 3 FIG. 4

FIG. 3. FRONTAL VIEW OF HEAD OF FORKED-HORN DOE NO. 36543, IN THE FLESH
FIG. 4. LATERAL VIEW OF HEAD OF FORKED-HORN DOE NO. 36544, IN THE FLESH

The third doe with horns (Mus. Vert. Zool. no. 36544) came to the University of California through the assistance of Dr. L. A. Herrick and Dr. R. T. Legge, of Berkeley. This was also a "forked-horn" doe in good flesh. This doe (see fig. 4) was shot October 8, 1926, near the Sequoia Silver Fox Farm at Lake Tahoe, California. The specimen was brought to the museum partly skinned and measurements and weights are not available. Evidence of sex was unmistakable on the fresh skin. The horns were hard and out of the velvet. They can be matched exactly by antlers of certain forked-horn bucks. The antlers of the horned does measure as follows:

MUS. VERT. ZOOL. NO.	SPREAD	HEIGHT ABOVE CROWN	CIRCUMFERENCE AT BASE
	inches	*inches*	*inches*
35326	9¼	12*	
36543	10¾	9¼	2½
36544	12½	11½	3

* Antlers malformed; the right antler with five points has a height of 12 inches, while the left antler has four points and a height of 7¼ inches.

It is of special interest to note that all three of these horned does came from the same general locality; the Truckee region near Lake Tahoe, California. Referring to deer, T. H. Morgan, in "The Genetic and Operative Evidence Relating to Secondary Sexual Characters," published by the Carnegie Institution of Washington, (1919, p. 70), states: "There are, however, a few records of horns developing in this sex [female] in old age, or presumably after disease of the ovaries." In the first instance here cited such may have been the case since the doe was obviously old and the horns were malformed and in the velvet. However, the other two does were both relatively young individuals and there was no evidence noted that would lead one to believe that their reproductive organs were aberrant. Both of these younger does had hard, normal, symmetrical horns.

Museum of Vertebrate Zoology, University of California, Berkeley, California.

PAUL MATSCHIE

By Ernst Schwarz

[*Plate 31*]

Professor Georg Friedrich Paul Matschie, curator of mammals and second director of the Zoological Museum, Berlin, died on March 8, 1926, aged 64.

Born at Brandenburg on the Havel, Prussia, on August 11, 1861, he was educated at the gymnasium there, and later studied mathematics and natural sciences at the universities of Halle and Berlin; but he never passed an examination nor took a degree. In 1884 he was private tutor at the house of the well known canary bird dealer Maschke of St. Andreasberg, Harz Mountains, worked at the natural history establishment "Linnaea" at Berlin in 1885, and, in 1886, joined the Zoological Museum, Berlin, where he remained until his death. At first voluntary aid in the bird room under Cabanis, then employed in the removal of the museum collection from the university to its present quarters, he took charge of the department of mammals in 1892, became curator in 1895, professor in 1902, and second director of the museum in 1924. In 1901 he was secretary general of the Fifth International Congress of Zoology at Berlin, and editor of its proceedings. In the summer of 1925 he visited a number of public and private collections for a study of European deer, and it was immediately after his return to Berlin that the first signs became apparent of the fatal disease, cancer of the rectum, to which he finally succumbed. He was married twice, but had no children. In 1895 he married Anna Held, an artist, who illustrated a number of his earlier writings, and who died in 1898. His second wife, Franziska Schwark, whom he married in 1906, survives him.

Matschie began his scientific career as an ornithologist. For many years he was recording secretary of the German Ornithological Society, and drew up the minutes of its meetings. His actual work in the ornithological line was, however, not very extensive and, except for the account of birds in "Das Thierreich," edited by L. Heck, he only published casual observations and notes including the description of a new wren. After becoming, in 1890, an officer on the staff of the Berlin Zoological Museum, apart from writing a few papers on reptiles, he only dealt with mammals. The scientific standard of these early papers is variable. He was in the habit of publishing articles in popular or semipopular journals and books, and even daily newspapers, and there, unfortunately, very often explained his principles on evolution

and distribution, or even gave descriptions and figures of new forms; but later he only referred in a casual way to these earlier publications, which are almost or quite inaccessible. Nevertheless some of these notes are distinctly important both from the scientific and the personal aspect, and the compilation which Pohle[1] has given of them is very welcome, the more so as separate copies of most of these writings are kept at the Berlin Museum.

It is very interesting to trace Matschie's development as a scientist. Within the few years following his appointment as curator of mammals, he had gone into the subject profoundly, and obtained a broad view of the whole field, and a stupendous knowledge of single facts and of the literature. It is during this part of his career, especially between 1895 and 1905, that he did his best work. When last autumn the writer visited various European museums he found himself following Matschie's route of 1895 and 1896 when preparing his volume on the fruit-bats of the Berlin Museum. From the notes Matschie had made on the labels of specimens his comprehensive knowledge of mammals and his clear judgment of forms imperfectly known at that time were made to appear striking. This knowledge of species and specimens, as well as his admirable memory, increased with years and experience, and was at once apparent to everybody who came in touch with him. When in later years his clear judgment decreased, this was due to prejudices developed, and gradually strengthened, in connection with his peculiar views on distribution. These views were not based on the evidence of the naturalist but on his firm belief in Creation which formed species once for all, and left them unchanged in their native place. Up to the last he remained a decided opponent of the theory of evolution, a fact which, to a certain extent, may be ascribed to his deficient knowledge of general zoology and of palaeontology, sciences which he always regarded with the naïve curiosity of the outsider.

To make facts agree with his dogmatic views he advanced various theories to explain the distribution of animals which, although at the first glance appearing to be entirely different, are really developed from one another. In 1894 he first published[2] his theory of the river-basins as primary distributional centers which maintained that every greater or smaller river system was inhabited by a species, or local race of a certain group, and that the watersheds between the various systems

[1] Zeitschr. f. Säugetierk., I, pp. 90–110, 1926.

[2] Zool. Gart., XXXV, pp. 33–39, 65–79, 1894; Verh. Ges. Erdk., Berlin, XXXI, pp. 247–56, 1896; Sb. nat. Fr., pp. 86–93, 170–81, 1898.

were effective barriers. There is some truth in this theory, large river basins being natural centers of faunal evolution, the more so if separated by mountains, or dry zones, from the neighboring systems. To a certain extent, therefore, this view is in accordance with the theory of the evolution of species by migration and isolation, advanced many years ago by Moriz Wagner.[3] But carried too far, as it was by Matschie, and applied to minor and even minute waterways, it became absurd, and led to the impossible hypothesis, invented by Matschie himself but first published by Zukowsky,[4] of the so-called half-sided hybrids. These were said to occur in the boundary zone of the distributional areas of two forms, and were maintained to possess the characters of both parents, bilaterally arranged in the body of the offspring. As a consequence of this hypothesis two "species" or "subspecies" have several times been described from a single specimen taken on a watershed; the right side of the animal was believed to present the characters of one, and the left side those of the other of the two neighboring and hybridizing forms.

Of course even these far reaching premises were not sufficient to explain individual variation, and it was therefore that during his last years Matschie developed a new theory of what he called the "elementary areas of distribution,"[5] a theory which was not that of a naturalist but a mystic, and practically led to the formation of a new racial or specific name for every specimen slightly deviating from the normal type. He believed these elementary areas to be squares delimited by the diagonals of the squares formed by the even degrees of longitude and latitude.

In spite of these theoretical shortcomings the services rendered by Matschie to mammalogy in general are very considerable. His many papers, especially on African ungulates and primates have contributed much to our present knowledge of these groups, and his name will always be perpetuated in the great number of species and races described by him in those fortunate days when it was the good luck of the museum worker to find new and singular types in almost every lot of specimens received from abroad. Among the more remarkable of these forms are the two peculiar Anomalurine rodents, *Idiurus zenkeri* and *Zenkerella*

[3] Die Entstehung der Arten durch räumliche Sonderung. Gesammelte Aufsätze, Basel, 1899. (First notes published in 1869.)

[4] Zool. Beob., II, pp. 225–33, 259–72, 1910; Sb. nat. Fr., 1910, p. 425, 1911; l. c., 1916, pp. 188–207, Taf. V–VIII, 1916; l. c., 1922, pp. 79–145, 1925.

[5] Article "Tierwelt der deutschen Schutzgebiete," in Schnee, H., Deutsches Kolonial-Lexikon, III, pp. 483–94, 7 text figs. Leipzig, 1920.

Berlin, Grüss!
Matschie.

insignis, representative of a new subfamily; the dwarf forest fruit-bat, *Scotonycteris zenkeri;* the East African shrew, *Crocidura martiensseni;* and the mountain gorilla, *Gorilla gorilla beringei.*

Matschie's activity for the museum covered, however, another important field, the care for the collection itself, which, at the beginning of his career, although containing such historical specimens as the types of Lichtenstein, Hemprich and Ehrenberg, and Peters, yet was small in extent. It is his personal merit to have obtained, with the smallest financial resources imaginable, large series of mammals, especially from the German colonies, and to have interested officers and colonials of every rank in natural history, and in the Berlin Museum. The collection of large mammals, ungulates, carnivores, and primates, is much more extensive than is generally known, and will take very many years to be properly studied and arranged systematically. Unfortunately Matschie was more inclined, toward the end of his life, to collect than to work out the collections arriving, and it is therefore that many species have been described elsewhere although represented in the Berlin Museum for many years.

As a fellow worker Matschie was amiable and, as a rule, hospitable and helpful. He always gave information gladly, and invariably had something to say from the vast fund of his experience. He had his peculiarities, increased in his last years when he was a sick man without knowing it, and when he was full of personal and political prejudices and suspicions. Anyhow he was a strong and pronounced individuality; a stimulating man to meet. His influence as the leading German mammalogist of his time will be felt for many years to come.

Zoological Museum, Berlin, Germany.

HOPLOPHONEUS MENTALIS, AND CUSP HOMOLOGIES IN CATS

By Horace Elmer Wood, II

Hoplophoneus mentalis is based on a left ramus of the lower jaw, described by Sinclair (1921). A second individual of this species (the third specimen of this genus to be recorded from the Lower Oligocene) was collected by Mannhardt and Wood of the New York University expedition, 1923, field number 177. It was found in fragments, weathered out on top of a high, isolated Titanotherium Beds butte, N. Y. U. locality 2NNlb, below the outer XU Ranch fence, near the west side of Battle Creek Canyon, Washington County, South Dakota. All fragments lay in an area about a yard square, clear from other fossils except a coprolite suggesting *Hyaenodon* by its size. Conceivably, it represented a gesture of contempt toward the dead cat (Wanless, 1923). I estimated by the height of the butte above the contact with the Pierre Shale (Wood and Mannhardt, 1925) and by concordant levels, that the top of the butte was probably less than ten feet lower than the base of the Oreodon Beds. The individual was a young adult, as the enamel of P^4 and M^1 had already been worn through in places, exposing the dentine, yet the head of the radius was not fully coössified with the shaft. I am indebted to Prof. W. J. Sinclair for permission to study the type in the Princeton Museum. The drawings are by Dr. Florence Dowden Wood.

The specimen consists of: both rami of the lower jaw, somewhat damaged, with LI_3 and RC_1 in place, and the roots or alveoli of the other teeth; LP^4; both first upper molars (damaged); the temporal regions of both sides; the basisphenoid; the distal end of the right humerus; the proximal end of the right radius; and various other small fragments of the skull and skeleton.

Comparative measurements show that this specimen is very close in size to the types of *Hoplophoneus mentalis* Sinclair and *Hoplophoneus oharrai* Jepsen, the two recorded Lower Oligocene species. Although both jaw flanges of the N. Y. U. specimen are broken, the right flange is sufficiently represented to permit a fair estimate of its length, which is, quite certainly, slightly less than that of *H. mentalis*, and, therefore, much less than that of *H. oharrai*. In the chief stated difference between the two species, therefore, it accords with *H. mentalis*. P. U. 12515, the type of *H. mentalis*, does not show clear evidence of more than two lower incisor alveoli. A very narrow alveolus for the median

incisor might, or might not, have been present. According to Jepsen (1926), three lower incisors are present in *H. oharrai*, and his paper indicates that they are all of normal size. The retention of I_1 and the greater depth of the chin flange are the only characters, so far apparent, separating *H. oharrai* from *H. mentalis*. It seems possible that the retension of I_1 is an individual character and the deeper chin flange a sex character in *H. oharrai*. Matthew (1910) refers to the loss of I_1 in some Middle Oligocene individuals of *Hoplophoneus* (e.g., *H. oreodontis*, A. M. N. H. No. 9764 from the middle Oreodon Beds).

Before discussing the dental characters of the specimen further, it is necessary to decide the probable cusp homologies, since the literature on this subject is in a thoroughly chaotic state. Perhaps the most common identification of the cusps of P^4 is that used by Jayne (1898), Matthew (1910), Tomes (1914) and Leche (1915), and the different but strictly equivalent terminology used first by Scott (1892), and by Davison (1903 and 1923). By the former system (fig. 5) A = parastyle, B = paracone, C = metacone, and D = protocone, and by the latter A = protostyle, B = protocone, C = tritocone and D = deuterocone. Bardenfieth (1913), Todd (1918) and Wood (1926) assume that A = paracone, B = metacone, C = metastyle and D = protocone.[1]

Some mesonychid creodonts (e.g., *Dissacus* and *Mesonyx*) suggest the first interpretation, but comparison should be made with the Miacidae and with other fissipedes rather than with inadaptive creodonts. My present identifications are as follows: A = parastyle, B = parametacone (new term for paracone + metacone), C = metastyle and D = protocone. The parametacone, of course, is the representative of the reptilian cone. Matthew (1907) apparently endorsed this view at one time. This interpretation is in general accord with modern views on cusp homologies and evolution, of which the best exposition is that of Gregory (1922 and 1926). As applied to the Felidae, this interpretation is obtained by comparison with $P^3 - M^3$ of *Deltatheridium* (Gregory and Simpson, 1926), of the Miacidae, with the upper molars of *Sinopa*, and particularly with P^3 of cats. All these comparisons agree with the interpretation that the high central cusp is the original reptilian cone, still undivided,—the parametacone; that the shearing blade is

[1] In this connection, may be mentioned, as a curiosity, this remarkable description of a cat's teeth. "The third (and fourth [upper premolars], when present) are true sectorial teeth . . . . the first true [lower] molar, which plays upon the inside and a little posterior of the body of the blade of the second or third upper premolar. There is usually no true molar above" Thompson (1899).

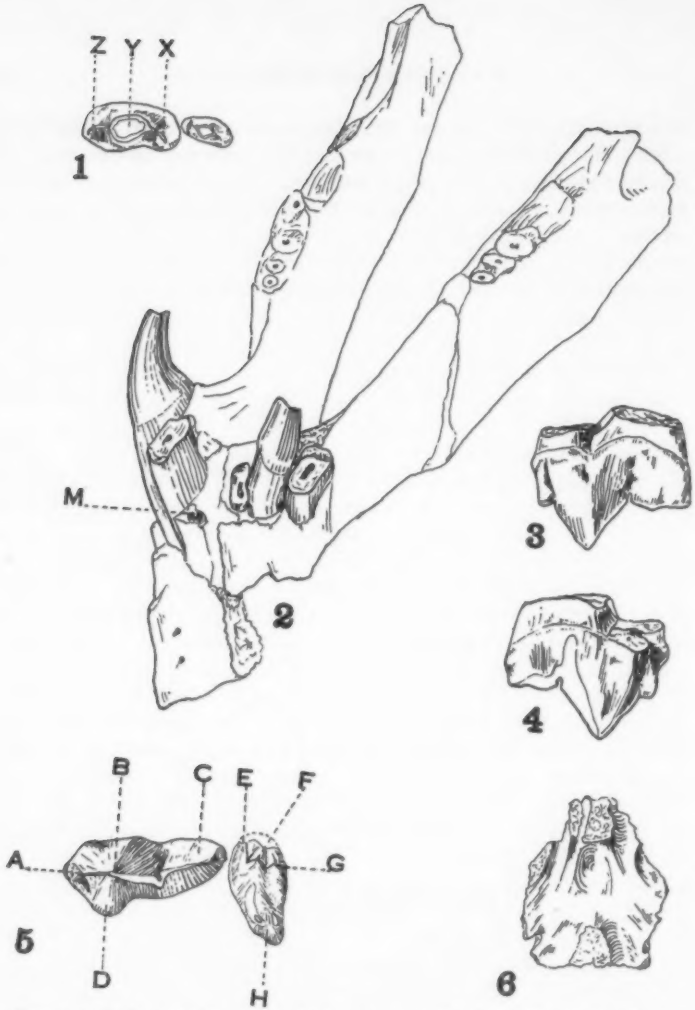

FIG. 1. Left P_{3-4} of type of *Hoplophoneus mentalis*, P. U. No. 12515; X, paraconid; Y, protoconid; Z, metaconid; crown surface; x 1.

FIG. 2. Mandible of *Hoplophoneus mentalis*, N. Y. U. Exp. 1923, No. 177; M shows possible small alveolus for first lower incisor, anterior to second lower incisor; antero-superior aspect; x 1.

FIG. 3. LP^4, N. Y. U. Exp. 1923, No. 177, buccal surface, x 1.

FIG. 4. LP^4, N. Y. U. Exp. 1923, No. 177, lingual surface, x 1.

FIG. 5. $LP^4 - M^1$, N. Y. U. Exp. 1923, No. 177, crown surface (M^1 partly restored from opposite side); A, parastyle; B, parametacone; C, metastyle; D, protocone; E, parastyle; F, paracone; G, metacone; H, protocone; x 1.

FIG. 6. Basisphenoid, N. Y. U. Exp. 1923, No. 177, dorsal surface, x 1.

the metastyle, and the anterior cusp is the parastyle. *Didymictis*, from the Torrejon and Lower Eocene, seems a possible morphological ancestor for the Felidae, and tends slightly to endorse this interpretation. The condition in M^1 of *Didymictis*, together with the morphology of this tooth in *H. mentalis*, N. Y. U. No. 177, suggests that the cusps of the latter should be reidentified as in figure 5. Finally, the analogy with the lower premolars consisting of primitive trigonids composed of large

TABLE 1

Comparative measurements of Hoplophoneus

	N. Y. U. NO. 177 H. MENTALIS		HOPLOPHONEUS MENTALIS TYPE L	HOPLOPHONEUS CHARRAI, AFTER JEPSEN
	R	L		
Depth of chin at flange from incisive alveolar border	e 64		67	81
Depth ramus at P_3	24.5	26.1	25.5	
Depth ramus at M_1	24.6	25.6	26.3	e 27
Length of ramus			145.0	150
Height at coronoid			42.2	
Width C_1 at base of crown	6.0		5.7	
Length P_3	r 7.7		r 8.4	
Length P_4	r 12.9	r 12.8	r 12.3	r 11
Length M_1	r 17.7	r 17.2	r 17.7	r 17
Diastema C_1-P_3	30.1		33.5	41
Canine ridge to anterior edge masseteric fossa	70.0	e 75	79.1	
Length P_3-M_1 (base)	36.8		38.6	38
Depth symphysis	e 45		62.9	72
Length P^4 (base)		19.9		19
Width, P^4 (base)		10.0		8
Humerus, distal end, greatest diameter	48.0			49
Radius, proximal head, width	21.6			
Radius, proximal head, A.—P	13.7			

e = estimated. r = along roots.

protoconids, with small paraconids and metaconids, all nearly in line, suggests that the buccal elements of the upper premolars are those composing the primary trigon—the parastyle, parametacone and metastyle. This interpretation is not capable of direct proof until the Eocene ancestry of the cats is traced, but it seems most in accord with the occlusal relations of P^4 and M_1, and with modern conceptions of cusp homologies.

The dental formula, so far as known, is $I_2\ C_1\ P_2\ M_1^1$. LP^4 has a sharp

parastyle and virtually no protocone, this condition being perhaps accentuated, in this specimen, by a break (figs. 3 to 5). M^1 has two transversely elongated pulp cavities, in line, under the paracone and protocone, respectively. It is somewhat primitive, for a cat, in its relatively large size and less marked cusp degeneration, since the parastyle, paracone and metacone are more nearly separate than usual. The most important new character, however, is the apparent reduction to two lower incisors on each side, as in *Eusmilus dakotensis*, tending to confirm Sinclair's suggestion that *H. mentalis* gave rise to *E. dakotensis*. In contrast with the latter genus, however, P_3 is present (fig. 1). The median incisors of N. Y. U. No. 177, if present at all, could only have been minute pegs directly in front of the second incisors (fig. 2, m). The loss, or, at least, extreme reductions, of the median incisors would appear to be a second specific character, in addition to the shorter chin flange, separating *H. mentalis* from *H. oharrai*. Of the two species, *H. mentalis* is the more likely ancestor for *E. dakotensis*, since the proportions of the jaw flange are more nearly the same, and since I_1 is lost in both these forms. If Matthew (1910) is correct as to the evolutionary trend of the sabre-toothed cats toward reduced jaw flanges, it is possible that *Hoplophoneus oharrai* is ancestral to *H. mentalis*, since it has a more prominent jaw flange, a more primitive dentition, and an apparently lower stratigraphic level (Jepsen, 1926).

The auditory meatus opens widely, ventrally, as usual. The low posterior border of the glenoid fossa permitted the jaw to open widely. The postglenoid foramen resembles the condition in *H. occidentalis* (Riggs, 1896). Both the dorsal and ventral aspects of the basisphenoid show a number of differences from *Felis domestica*. The sella turcica is, proportionately, less sharply defined, due to the fact that the tuberculum sellae and dorsum sellae are less prominent. It would be interesting to see if *Smilodon* has a much larger sella turcica, proportionately, as would be expected from its assumed more sluggish habits (Matthew, 1901 and 1910), and from its stocky build, on the basis of present information as to the functions of the hypophysis. The internal openings of the foramen lacerum anterius and foramen rotundum are closer to the mid-line than in the cat. The carotid groove rises to a "watershed" lateral to the dorsum sellae. The bore of the pterygoid canal is quite large, although both openings are constricted.

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A SIMPLE LIVE TRAP FOR SMALL MAMMALS

BY W. H. BURT

For those interested in catching small mammals alive to be studied in the laboratory, it has always been a serious problem to procure an effective live trap at a small cost. A number of commercial traps have been placed on the market. Some of them are quite effective, but they usually cost from two to five dollars each, thereby making it impossible for many individuals as well as institutions throughout the country to purchase a very large number at any one time. It is often desirable to have a large number of traps, as it takes very little more time to run a line of fifty traps than one of only a half-dozen, and the return is much greater for the effort.

In the fall of 1925 the author desired to obtain live mice of the genus *Synaptomys* in order that their habits might be studied more closely in the laboratory at Kansas University. Commercial traps were too expensive and many of them ineffective, so it was necessary to devise a trap that was not only simple, inexpensive, and easy to construct, but one that would protect the animal from severe weather until the trap

could be visited. With the help of C. D. Bunker, curator of birds and mammals at the Kansas University Museum, a live trap with all of the above requirements was constructed. With the aid of the diagrams the following description will, I believe, make clear the construction of this simple trap.

The material necessary is: a common mouse-trap, or better a special government Out-o'-sight mouse trap;[1] a tin can about the size of a Van Camps pork and beans can,—these are always available at the city dumps; a piece of hail screen one-fourth inch mesh to cover the end of the can; some fine wire to wire the screen to the spring, and a slightly larger wire to wire the can to the trap.

Cut one end out of the can, then cut a slot about three-fourths inch wide and one inch deep in the side of the can; this allows it to fit up around the trigger of the trap. A hole is made on each side of the slot about three-eighths inch from the margin and three-eighths inch from the end of the can, A and B in the diagram. A hole is bored through the trap on each side of the trigger, A′ and B′ in the diagram. These holes should be about three-eighths inch back of the spring and one and one-half inches apart, so they will match the holes A and B respectively. When mounted, the end of the can should come up against the spring. By passing the two ends of the heavier wire down through the holes and twisting the ends underneath, the can is securely fastened to the trap. A piece of hail screen large enough to cover the open end of the can is now wired to the side of the spring nearest the can; use the fine wire for this. With the material at hand it is possible to assemble twenty traps per hour at a cost of less than fifteen cents per trap.

A small bunch of dry grass or cotton should be packed in the back of the can. In severe weather this serves as a nest and the animal will remain alive for several hours, whereas it would otherwise freeze to death in a short time. The bait is placed well back in the can just in front of the nest material. The kind of bait used depends on the animal being trapped. For most mice a mixture of oatmeal, peanut butter, and small bits of bacon is good, but for *Synaptomys* I find that the most effective bait is finely chopped bluegrass, and for shrews meat is desirable. The traps may be set in runways, at entrances to holes in the ground, near brush piles, or wherever the mammals are to be found.

[1] The special government Out-o'-sight mouse trap is larger than the ordinary mouse trap and makes a much more substantial base; the measurements are 2.5 inches by 5.25 inches. These traps may be obtained from Oneida Community, Oneida, New York, or from the Animal Trap Company, Lititz, Pennsylvania.

In any case a small depression should be made in the ground so that the floor of the trap will be about even with the surface of the runway. A little finely broken dry grass sprinkled over the entrance to the trap

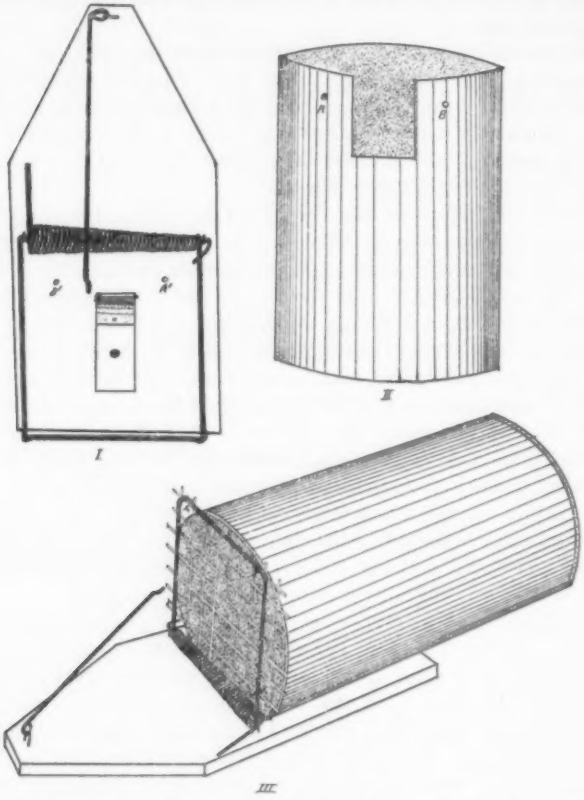

FIG. 1. I, GOVERNMENT OUT-O'-SIGHT MOUSE TRAP. II, CAN, SHOWING SLOT. III, TRAP ASSEMBLED

makes the mammals less suspicious; it is also well to cover the entire trap with long grass in such a way that it will not interfere with the closing of the trap.

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PHENACOMYS UNGAVA IN ONTARIO

By W. E. Saunders

In the case of a mammal so rare as the present species, the capture of a single specimen may be worthy of mention. The distribution of this species is given as Labrador to the eastern shore of Lake Superior. Little work in mammalogy has been done in Labrador, and as five of the seven specimens examined by A. B. Howell for his recent monograph (N. A. Fauna no. 48, 1926) are from that country it is a fair supposition that the animal is of reasonable abundance there.

On October 6 and 7, 1925, I trapped two of these mice at Franz, Ontario. Franz (altitude 1219 feet) is 195 miles north of Sault Ste Marie, 330 miles west of North Bay, and is a mere junction in the rocky wilderness. Morris M. Green had spent a couple of weeks there earlier in the summer of the same year and after he had failed to find this mouse in two weeks of careful study and trapping, it will be conceded that Lady Luck favored me greatly when one blundered into my trap the very first night.

Gerrit S. Miller, Jr., in his "Notes on the Mammals of Ontario" mentions the capture of seven of these animals at Peninsula Harbor in September and October, 1896. Peninsula Harbor (altitude 714 feet) is near the northeast corner of Lake Superior, 300 miles southwest of James Bay, and 112 miles west of Franz.

In August, 1926, I spent two weeks on the French River about 290 miles east of Franz, where we camped on Eighteen Mile Island. The first night's trapping on the island was a great surprise because thirty traps yielded absolutely nothing except a single deer mouse in the cabin. The next two nights the traps were in a rather dry sphagnum swamp a quarter of a mile away which did not show much sign and where results were again absolutely nil. Again just before the end of our camp we tried a rocky slope a mile away where there were some mouse runs (*Microtus*?) but for the third time we got absolutely nothing.

I correlated the results from these three locations with the fact that on the first morning a weasel surveyed me at short range and only thirty yards from the cabin; and that every day at intervals of a few hours the white-throated sparrows and other birds would excitedly declare the presence of an enemy within hearing distance. I was, therefore, thoroughly convinced that the island was well populated with weasels, and was sorry that I had not been there early enough to see what effect this had upon the ground-breeding birds, which must have had a very

hard time. Islands of suitable size have long been noted as exceptionally favorable places on which to trap small mammals, but this experience goes to show that weasels may so preponderate on a larger island as to entirely spoil it for that purpose. However, another puzzle which intruded itself was that chipmunks were common, *Tamias* near our camp, and *Eutamias* some miles away.

A few days after our arrival we disembarked on the mainland to play with a porcupine that was feeding at the water's edge. Finding good mouse-runs we set a line of traps there the next day, and obtained results very different indeed from those we had experienced on the island. Every day yielded us a fair proportion of success, and we averaged better than one *Synaptomys* or else a *Phenacomys* each morning. About the third morning I was delighted at finding a full grown *Phenacomys* in a run through the grass beside open rock; and on the same morning I got a similar specimen in dry dark woods of spruce, balsam and birch. Here was a real puzzle; individuals of a species supposed to be an inhabitant of blueberry barrens were taken,—one in a grass run on bare rock, one in deep woods, and two in open sphagnum; clear hints that we do not know everything about *Phenacomys*. Furthermore, all these specimens were females, and in reading Mr. Howell's life history of *P. longicaudus* one is moved to speculate as to whether different habitats for male and female are the rule in this genus rather than the exception.

When we made the first landing at this place we immediately found a splendid hole eight feet from the bow of the canoe. The trap set there was sprung without a catch the first morning. The second morning it contained an adult *Synaptomys;* and while resetting the trap I saw in the hole the remains of the mouse which had been killed, but not caught, the preceding morning. It was half-devoured by ants and was thrown away, after the most casual examination, as another *Synaptomys*. Thereafter, almost every morning that hole yielded a young mouse, usually more or less eaten by ants around the face. But the last one showed a yellow tinge around the nose, and then examination and comparison of measurements showed that the tails of these one-third grown mice were already longer than those of adult *Synaptomys*, which I was carelessly supposing them to be. They are, in fact, three juvenal *Phenacomys*, and I have no doubt that the one killed on the first night, but not saved, was the mother, and that the male was absent. These young are so nearly of a size that they are doubtless members of the same brood. As we caught no more, the supposition is that the brood

may have been three. Furthermore, the female caught in the woods had three unborn young, which looks as though three is a normal brood for this species.

Mr. Miller's first specimen was taken in a sphagnum bog and he lost much time in unsuccessful attempts to trap more in similar places, after which he found these mice on high upland barrens and around ruined log huts. This last location is, of course, a favored one for many species, as it affords excellent protection from enemies. One can get most of the indigenous mice in such places.

My own experience exactly paralleled that of Mr. Miller for a time, the two specimens that I took at Franz being taken in a run in sphagnum right in the railway enclosure and within thirty feet of the rails. But the 1926 catch of three juvenals and two adults was obtained on rocky slopes, with the exception of the one which was taken in spruce and birch woods. Contrary to Mr. Miller's experience, I have taken no adult males whatever, both the Franz pair and the French River pair being females.

It will therefore be seen that this mouse may be found inhabiting almost every type of country provided by the north woods, and of the fourteen specimens taken by Mr. Miller and myself, six were taken on open rock (that is, the cracks between the rocks covered with vegetation), three in sphagnum swamps, four around log houses, and one in birch and spruce woods, which would seem to be the least favored location. Lastly, all of mine were taken in runways, with the single exception of the one in the woods at the French River, which was taken at the base of a tree where the ground showed, as plainly as open ground can show, that it was a thoroughfare for small mammals.

London, Ontario.

GENERAL NOTES

THE WHITE-TAILED DEER IN CALIFORNIA

Because of the continual enquiry regarding the status of the white-tailed deer (*Odocoileus virginianus macrourus*) in California it is deemed advisable to put on record the following notes. On October 17, 1924, William Horn of Lassen County, California, stated in conversation with the writer that during the last days of January, 1922, while collecting a group of deer for the Oakland Museum, he shot a white-tailed buck that had recently shed its horns. This deer was killed three miles west of the Nevada line, in California, about eight miles northeast of Observation Peak, Lassen County, as shown on the Honey Lake Quadrangle of U. S. Geological Survey map, 1913 edition. This deer was saved as a specimen. Previous to this, Mr. Horn, who is in the writer's estimation one of the most reliable observers of deer in California, shot and killed a three-point white-tailed buck. It is Mr. Horn's opinion that this band of white-tailed deer, which consisted of twelve or thirteen individuals, came into California from the Pine Forest Mountains of Nevada. They were seen repeatedly near his ranch during the summer, fall and through the winter until the last of January. It is possible that they may again visit California.—Joseph Dixon, *Museum of Vertebrate Zoology, Berkeley, California.*

A MINK FIGHT

The night of November 24, 1926, was cloudy and dark, with the temperature well above freezing. About 8:30 I heard a screeching which I knew nothing but a mink could produce coming from the direction of a small stream about a quarter of a mile from my home at Lawrenceville, Virginia. The cries continued with such regularity that I took a lantern and started to find out what was the trouble. All the time I was walking the distance to the stream the screeching continued with only very short intermissions. I reached the stream during one of these lulls, and stopped on the bank of a little pool. Almost at once there was a pattering of feet on the gravel on the opposite bank, a splash in the pool, and the screeching began again, almost under my feet. Turning the lantern sidewise so as to throw the light on the water, I could see a mix-up of lithe, brown forms, swiftly whirling about in the water. In a few seconds the cries ceased and there came a sound of rapid swimming as the combatants crossed the pool. Then followed a scurrying through the leaves as the animals raced down the opposite side of the creek, every few seconds giving vent to their rage in an outburst of mink profanity, until they were out of my hearing.

I surmise that this was a fight between two rival males; but I would like to hear from those who are wise in the ways of minks, as to what was going on.—John B. Lewis, *Lawrenceville, Virginia.*

EXTENSION OF RANGE OF TWO MEMBERS OF THOMOMYS DOUGLASII GROUP

Thomomys douglasii douglasii was first collected by David Douglas at Fort Vancouver, Washington, about 1825. Seven topotypes were later taken by Clark P. Streator in 1894 (North Amer. Fauna, no. 39, pp. 116–117). As far as records show, this rodent has not been found since Streator's collection was made.

On June 12, 1926, a specimen of *Thomomys* was taken on a farm bordering the Columbia River Highway, one mile south of Scappoose, Columbia County, Oregon, and later thirty-four others were collected within a mile and a half of the same locality.

Upon submission of nine of the specimens to the Biological Survey, Vernon Bailey stated that they were closely allied to *Thomomys d. douglasii*, but not typical. For the present he is calling them *Thomomys d. douglasii*, and extending the range of this form across the Columbia River into another state. As far as can be determined, the new area of distribution is isolated and does not embrace over two sections of land.

The Scappoose specimens are decidedly smaller than the topotypes collected by Streator. Of the last fifteen specimens obtained by the writer, the greatest total length of any individual was 202 mm. The topotypes show an average length of 215 for males and 200 for females (North Amer. Fauna, no. 39, pp. 116–117). The Scappoose material, all adults or practically so, gave average length of 188 for seven males and 178.6 for eight females. Tail vertebrae measurements of the topotypes were: males, 64; females, 58; of the Scappoose material both sexes gave an average length of 54.3. Hind foot measurements of the topotypes were 30 for males and 28.6 for females, while the Scappoose specimens gave 25.8 for males and 25 for females.

Variation is also noted in the skulls. The topotypes are described as having a transversely oval interparietal. In the Scappoose skulls it is practically triangular. The pterygoids are more inclined to be V-shaped than U-shaped. Skull is smaller in all external measurements. The white breast-patches described as appearing upon all of the topotypes occur occasionally in the Scappoose specimens.

Thomomys douglasii oregonus, prior to 1921, was known only from specimens collected by Streator in 1893 at the type locality, Oregon City, Oregon. In 1921, several specimens from Canby, Oregon, about ten miles south of the type locality, were identified by Bailey. These were obtained by Russell Ferguson in June, 1921. In August, 1922, the writer collected additional specimens from the vicinity of Tigard, Oregon, about fifteen miles northwest of Oregon City and on the other side of the Willamette River. Later, specimens were obtained from the vicinity of Sherwood and Farmington, Oregon, the latter location being about thirty-five miles west of Oregon City and on the opposite side of the Willamette River. Specimens were also procured later from Falls City, Black Rock, and Summit, Oregon, the greatest distance being about seventy-five miles from the type locality. Identification, in all instances, was made by Bailey.

Is it possible that *T. d. oregonus* at one time occupied the Willamette Valley floor and has been driven out by *T. bulbivorus*, the largest of the genus? The absence of *oregonus* from the valley floor where *bulbivorus* is abundant and its isolated distribution might indicate such to be the case. In the immediate vicinity of the type locality *bulbivorus* is not numerous and *oregonus* is found on the valley floor. In all other localities the smaller species is found on hill tops or higher tributary valleys, and *bulbivorus* is abundant on the adjacent valley floor.

Thomomys niger, closely affiliated with the *douglasii* group, has been taken by the writer on the Benton-Lane County line, Oregon. This extends its known range twenty miles north. Surface indications show that its range probably

extends north into Benton County at least a mile.—A. W. Moore, *U. S. Biological Survey, Portland, Oregon.*

FOOD HABITS OF A POCKET GOPHER

During August, 1926, while collecting in the western part of Nebraska, I obtained a live pocket gopher (*Geomys lutescens*) at North Platte and sent it back to the university with a shipment of live material in which I was particularly interested. At the time of capture it was quite young but very active and able to forage for itself. The first weight record I have for it is forty-nine grams on August 12. Since then it has grown steadily and more than doubled in weight, the most recent record being one hundred and twelve grams, January 2, 1927.

Its food has consisted principally of grain and carrots although this was supplemented occasionally in the fall with white clover and apple has also been frequently added to the ration. The grain at first given consisted of oats and corn but this has been entirely replaced by rolled oats since the latter part of October.

The interesting thing about its food habits is its liking for meat. Very soon after it came into captivity this was discovered mainly out of curiosity on my part. I have a number of live ground squirrels which are fed a regular ration of meat, and it was while feeding these squirrels soon after my return to Lincoln in late August that I offered this pocket gopher a small bit of fresh beef, and to my surprise it took the meat without hesitation and ate it greedily. Since then it has been receiving small amounts of meat (four to eight grams) rather regularly, which it always devours with great gusto. The meat given it has always been either fresh lean beef or liver except on two occasions when cooked beef was supplied instead.

I have searched the literature at hand rather carefully for any possible mention of meat eating proclivities of pocket gophers, even in captivity, but in all instances they are referred to as being "vegetable feeders" or as "strict vegetarians" as Bailey refers to the food habits of all pocket gophers (Bull. No. 5, p. 17, Division of Ornithology and Mammalogy, U. S. Dept. Agriculture).

Doctor Merriam (North Amer. Fauna no. 8, p. 19) also says in regard to the food habits of the *Geomys* species: "The food consists chiefly of roots, tubers, and other rather hard vegetable substances, though grass and the succulent parts of plants are sometimes eaten." Warren uses substantially the same language (The Mammals of Colorado, p. 88) when referring to the food habits of all species of the family Geomyidae. The one exception I find is the statement made by C. E. Johnson, that a female pocket gopher (*G. bursarius*) he had in captivity "turned cannibal" and ate her young; also that it had eaten bits of fried egg given it (Journ. Mammalogy, vol. 7, no. 1, p. 37, 1926).

An interesting observation on the liking of this particular pocket gopher for meat is that, contrary to its usual custom of storing the food as given it, in a corner of the cage or under the nest material, and then eating what it desires at its leisure, it always eats the meat at once and ignores all other food, as though it seemed to know that meat needed to be eaten at once and could not be stored for future use.

When grain and vegetables are given it, its mouth is nearly always used in grasping the food first, then its front feet are brought to its assistance if the objects are too large to be conveniently handled otherwise, then it races away, as

frequently backwards as forwards, to a corner of the cage or to the nest to deposit its load, returning for more—oftentimes pausing to "wash" its face and top of head, rubbing briskly with its paws—until it has sufficient or the supply has been exhausted. When given small pieces of carrot it has made as many as forty trips before being satisfied, although it is usually content with ten or fifteen pieces. When fed grain it fills its cheek pouches from the dish, picking up the pieces with its teeth, then shifting them back into the pouches with its paws, first filling one pouch, then the other. The food is then carried to the place selected for storing on that occasion and unloaded in the characteristic manner with the front feet. The food is never allowed to remain in the dish or on the floor of the cage but is always carted to some other spot which better suits the fancy of the animal even though the actual distance moved be less than a foot.

This interesting rodent has become a great pet and seems to enjoy being handled although it is very active with its long, sharp claws, frequently to the discomfiture of the person holding it. It makes no attempt to bite one beyond "testing" the "solidity" or "texture" of some part of the hand, but it will cut through clothing or attempt to gnaw through some metallic substance which engages its attention, such as a chain or ring.—Otis Wade, *Department of Zoology, University of Nebraska, Lincoln, Nebraska.*

MICROTUS CHROTORRHINUS CHROTORRHINUS FROM LOWBUSH, LAKE ABITIBI, ONTARIO

During the summer of 1925 a party from the Royal Ontario Museum of Zoology made a faunal survey of the Lake Abitibi region. Prior to the publication of a report on this work I wish to record the capture of eleven specimens of *Microtus chrotorrhinus chrotorrhinus* made by W. J. LeRay who did the major part of the mammal collecting. All of these specimens were taken near Lowbush during the month of July. The only previous record of this species in Ontario is that of Saunders, who reports its occurrence at Rossport (Canadian Field-Nat., vol. 36, p. 138).—L. L. Snyder, *Royal Ontario Museum of Zoology, Toronto, Ontario.*

AN OLD RECORD OF THE MOUNTAIN LION IN NEW HAMPSHIRE

About the year 1900, I heard of a mountain lion that had been killed, years before, in southeastern New Hampshire by William F. Chapman, who was then living at New Market, N. H. As it was the only instance of the actual killing of this animal within the limits of the state that had, or has, come to my attention, I visited Mr. Chapman to learn the particulars. I was shown the mounted skin of the beast, greatly over stuffed, which for years had been shown at neighboring fairs, but was then secluded in the attic of the Chapman home. At that time, Mr. Chapman, though aged, was in full possession of his faculties. He showed me the 14-gauge double, muzzle loading gun with which he turned the trick.

Mr. Chapman was an enthusiastic fox hunter. On the morning of November 2, 1853, he started out with his hounds after foxes. In the township of Lee, Rockingham County, his dogs gave voice, and before long were evidently close to something either treed or holed in a growth of young pines among which were several large, wide spreading trees. Approaching noiselessly over the pine needles that covered the ground, he beheld the great cat standing with two feet

on one branch and the other two on another branch of one of the big trees. Swaying its tail from side to side, it was giving its entire attention to the dogs. Bringing his gun to his shoulder, the hunter approached slowly and silently till within a few feet of the lion. Suddenly the lion looked down at the man, and at that instant a number four shot passed through the lion's eye and entered its brain. For a bit, it hung by one foot, then it dropped and proceeded to tear up the ground as head-wounded animals often do. It weighed 198 pounds and measured 8 feet and 4 inches from tip to tip.

Albert DeMerritt, a substantial native and life-long resident of Durham, which adjoins Lee, wrote me in 1906 that his father saw the lion several days before it was killed. It was lying on a pile of cord wood beside the road. When the De Merritt team drew near, the cat rose leisurely, stretched and disappeared. After it was killed and before it had been skinned, the elder DeMerritt took his children, including the aforesaid Albert, to see the lion at the Chapman homestead.

The badly mounted skin of this lion is now in the possession of the Woodman Institute, a public museum in Dover, New Hampshire.—NED DEARBORN, *Sacket Harbor, New York.*

THE RICE RAT IN MARYLAND

Five specimens of the swamp rice rat (*Oryzomys palustris palustris*) were trapped at Nanjemoy Creek, Charles County, Maryland, on January 7, 1927. Although known from southern New Jersey, this species has not heretofore been recorded from Maryland. E. A. Preble took two specimens in January, 1909, at Popes Creek, Virginia, a few miles south of Nanjemoy Creek, on the opposite side of the Potomac. More extensive trapping in the tidewater region of Maryland doubtless will show this animal to be generally distributed in the marshes.—ARTHUR H. HOWELL, *Biological Survey, Washington, D. C.*

FERNANDO PO AS AN APE RESERVE

The importance of preserving the higher apes for biological and psychological studies is too obvious to need discussion. Nevertheless they are doomed to extinction unless something unusual is done to prevent it. The reservation in northeast Belgian Congo may help the gorilla for a time; but unless hunters and collectors can be exterminated or reformed, I believe that any reserve on the mainland will be ineffectual. The island of Fernando Po, running up to 10,000 feet, offers every variety of tropical climate except the extreme xerotic. The scanty inhabitants could, under subsidy, be utilized to provide plantations to satisfy the raiding instinct of the apes, at the same time giving a greater variety of food. The temptations which mainland reserves offer to land grabbers and poachers would be minimized; and unless the different species should prove mutually exclusive the island might offer a permanent home to gibbons, chimpanzees, orangs and gorillas.

To finance the deal the clan-instinct of some Croesus could undoubtedly be aroused if scientists would put their minds on it; or international grants might be provided. But it should be done soon or cacao and palm-oil plantations will have spread to a prohibitive extent.—H. GIFFORD, *3636 Burt St., Omaha, Nebraska.*

MIGRATIONS OF THE WASHINGTON BLACK-TAILED JACK RABBIT

Interesting indeed are the recorded movements of the Washington black-tailed jack rabbit (*Lepus californicus wallawalla*) in extending its range into the sage—brush and bunch-grass sections of eastern Washington. These movements have had a northward trend until natural barriers have apparently forced an eastward and westward expansion. At the present time the black-tails inhabit practically all the range occupied by the western white-tailed jack rabbit (*Lepus townsendii townsendii*) with the exception of the Okanogan Valley. The ranging habits of the two species are slightly different, the black-tails sticking to the sagebrush, while the white-tails find the bunch-grass and rabbit-bush cover more to their liking.

Apparently, migrations of black-tails were more noticeable during years of greatest abundance, combined with favorable climatic conditions. Shortage of grass in dry summers, and prolonged sub-zero temperature accompanied by snow which covered river barriers with ice, were factors influencing migration.

The type locality of the sub-species *wallawalla* is Touchet, Walla Walla County, Washington. It was described by Merriam in 1904.

It is not known definitely when the first black-tailed jack rabbit appeared in the state, but it is assumed that entrance came through Umatilla County, Oregon. The species is known practically throughout eastern Oregon, northeastern California and northwestern Nevada. Quoting from Dice: "According to Abe Goodwin, an oldtimer in the valley, there were no black-tailed jack rabbits in the region [Walla Walla] when he arrived there in 1866, only white-tails. A long time later a few black-tails appeared and eventually became abundant, while the white-tails diminished and are now practically confined to the bunch-grass areas on the higher hills. This information is corroborated by a number of old residents. In the early days the whole valley was covered with bunch grass, with little sagebrush or rabbit bush. Due to overgrazing by stock, the bunch grass has been nearly exterminated and replaced by sagebrush and other shrubs."

One should not place too much weight on the reports of old-time residents, as their observations on dates and places are frequently hazy. However, when two or more give somewhat the same information, some credence can be attached to it. Interviews with farmers in connection with rodent control campaigns throughout the region covered by this paper, together with personal observations over a period of eight years, have been used by the writer as a basis for the following:

Between 1905 and 1907, the range of the black-tail covered western Walla Walla County, along the Columbia River as far north as its conjunction with the Snake River. About this time extremely cold weather froze the Snake River near Pasco, permitting rabbits to migrate over the ice. From 1908 to 1912, the species migrated as far north as Grant County, a distance of forty miles. From 1913 to 1920, the northward migration extended into most of the Big Bend region and as far east as Ritzville and Washtucna. Another cold snap in January, 1920, with sub-zero temperature for a few days, caused the Columbia River to jam with ice near Hanford in northern Benton County, and near Patterson in the extreme west end of the same county, allowing the black-tails to cross from the Oregon side and from Franklin County. At the time this is written (January, 1927) these

rabbits are found throughout the sagebrush areas of Benton County, and on the east side of the Yakima River in Yakima and Kittitas counties. The last record showed them to be within a few miles of Ellensburg, where the northwest migration is checked by the Wenatchee Mountains.

Between 1920 and 1926, an eastward migration has extended the black-tails to the Spokane County line, and also into the heart of Whitman County, almost to the Idaho border. The rabbits are confined, of course, to sage-covered draws and watercourses.

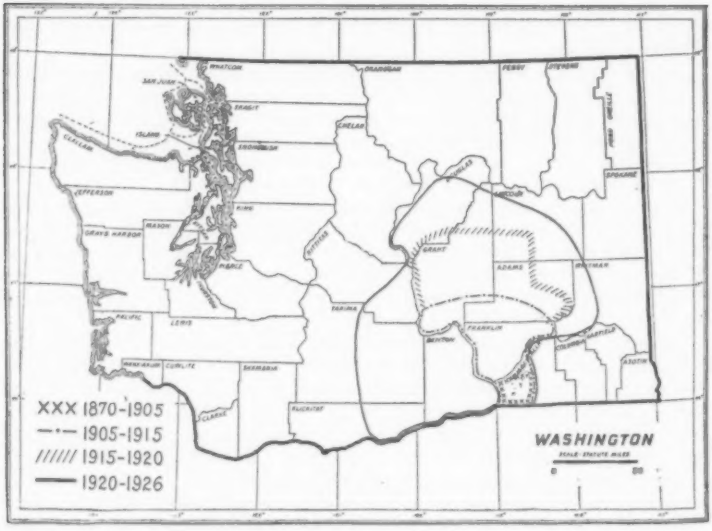

FIG. 1. MAP SHOWING MIGRATIONS OF THE WASHINGTON BLACK-TAILED JACK RABBIT DURING THE YEARS 1870 TO 1926

A study of the Washington state map will show there is very little of the sagebrush country unknown to this species. Perhaps, at some future time, the Columbia River may freeze and jam, permitting the pest to enter the Okanogan Valley. This, however, will be a small conquest, considering the areas so recently inhabited.—LEO K. COUCH, *U. S. Biological Survey, Olympia, Washington.*

NOTES ON THE SAN BERNARDINO FLYING SQUIRREL

During the summer of 1926, while Wright M. Pierce and the writer were at Big Bear Lake, elevation 6750 feet, in the San Bernardino Mountains, California, we made special efforts to collect the imperfectly known San Bernardino flying squirrel (*Glaucomys sabrinus californicus*), which is restricted to the San Bernardino and San Jacinto Mountain ranges. Big Bear Lake lies in Bear Valley, a

nearly level plateau comprising about sixteen square miles, with an east and west trend, and bordered by ridges 500 to 1500 feet higher. All of our trapping was done on the ridge overlooking the south side of the lake, in the vicinity of Red Ant Creek, which rises some four miles up the ridge.

On June 26 about thirty traps were set over a line about a mile long, and on the morning of the twenty-eighth an adult *Glaucomys* was secured. The following day another was taken at the same locality, and the line was extended for another mile by the addition of about two dozen more traps. From that time on we obtained a flying squirrel on an average of every three days until the traps were taken up September 2. The number of days between catches varied more or less, there being periods sometimes of a week or more between the captures at any one spot of our line, which became widely extended as the season advanced. However, when two weeks passed without results in a particular section, the traps of that locality were usually moved farther up the ridge, and a dozen more added to the line, so that by the end of the summer there were about eighty traps scattered all the way up one side of Red Ant Creek to its source, and back down the other side of the canyon.

In one case, however, a few traps were left for about two months at the locality where the first squirrel was obtained. As a rule not more than two adults, usually a pair, were taken at any one spot. But at this locality four adults were trapped during the first five weeks, and then after an interval of nearly a month a fifth was obtained.

Although musk-melon was tried for a week, all our squirrels were obtained by using dried prunes. Our traps, of the ordinary variety for rats, were visited twice daily; once at about seven in the morning and then again just before dark. This second visit was chiefly for the purpose of removing diurnal visitors, such as chipmunks and squirrels of various kinds, from the traps, which were constantly set and baited. However, on two occasions flying squirrels were taken from the traps in the evening, and as their condition indicated that they had been dead many hours, they must have entered after seven in the morning, when the first visit was made. Another individual, found in the morning, was still vigorously alive, and could not have been there ten minutes, for no animal of that size remains alive many minutes after being struck just behind the shoulders by a rat trap.

Sometime in July, after a particularly unfruitful period, the traps, up to this time on the ground, were nailed to the trees, chiefly on the trunks about six feet from the ground, but also on the lateral branches much higher up when the trees were small enough to climb. Such a marked increase in the number of catches was noticed that this method was continued thereafter, and since it became evident early in the season that we were successful only with those traps which were set on silver firs (*Abies concolor*), which were very common on the ridge, resort was made to no other trees.

Although large firs at the base of which flying squirrel sign was abundant were made use of whenever possible, this factor did not appear to be very important, since most of our specimens came from medium-sized trees, or clumps of smaller firs, around which sign was usually absent; and none of the dead trees which because of their cavities appeared suitable for nesting yielded results. Neither did the squirrels seem to favor any particular locality, for they were taken at all points from the lower end of Red Ant Creek, where trees in the canyon bottom

are plentiful, to where the creek rises at the top of the ridge, nearly a thousand feet higher, in surroundings where the firs are less numerous and restricted to the ravines.

Of the twenty-two specimens collected, twelve were adult males, seven adult females (none in breeding condition), two were immature females a little less than half-grown, and one a male of the same size, all three young having been taken in one locality. These skins are now in the collections of Wright M. Pierce and E. L. Sumner, Jr., at Pomona College. The weights in grams and other measurements for the adults are given in the table below. Besides the immature specimens, two of the adults are not listed in the table because one individual, from causes unknown, had a third of the tail missing, while another possessed only a stump.

Considering the small number of this species previously procured, and in view of the fact that to obtain the number which we did, most of our eighty traps were in continuous operation for sixty-nine days over a line some twelve miles long, entailing a total distance of several hundred miles walked during the summer (although not more than eight miles were worked at any one time), it appears that the San Bernardino flying squirrels are very difficult to trap, not because they are particularly wary (sometimes we caught them the first night in a new set), but because of their relative scarcity, their arboreal habits, which do not lend to ordinary trapping methods, and perhaps because an ideal bait has not yet been discovered.

Table of measurements

SEX	WEIGHT	TOTAL LENGTH	TAIL	FOOT	EAR
	gms.	mm.	mm.	mm.	mm.
♂	111.6	277	131.5	34	24
♂	109.7	292	136.5	38.5	24
♂	123.3	306	138	38	21.5
♂	122.1	279	136.6	38	23
♂	109.9	286	127	37	21
♂	104.6	299	140	37.5	22
♂	104.3	286.2	134.4	36.5	20.9
♂	115.6	297	129	39	22.2
♂	137.3	301	139	38.5	26
♂	114.7	294	134	39	24
♂	114.7	278	130	38	23
♂	114.6	301	137	36.5	22
Average.....	115.2	291.3	134.4	37.5	22.8
♀	126.3	285	134	37	21
♀	143.8	306	141	43	23
♀	144.2	305.5	139.5	39.5	23
♀	144.6	292.5	139	37	24.2
♀	127.0	305	141	39	24
Average.....	137.1	298.8	138.9	39.1	23.0

—E. L. SUMNER, JR., *Pomona College, Claremont, California.*

RECENT LITERATURE

Henderson, Junius. THE PRACTICAL VALUE OF BIRDS. New York: The Macmillan Company, 12mo, pp. xii + 342. Cloth, $2.50. May, 1927.

As our author states in the preface: "This volume is an effort to analyze and digest the North American literature of the subject and to bring together into one body the more significant data of economic ornithology in systematic arrangement, preceded by a discussion of the general principles involved and the more important groups of facts." It is a detailed summary of the work that has been done in economic ornithology accompanied by numerous references to literature and an extensive bibliography. The book is divided into two parts, the first consisting of a general discussion of the function of birds in nature, their relation to farm crops and forests, their effect as scavengers and in the control of noxious plants and animals, their status as carriers of disease, and other topics. Part two covers some two-thirds of the volume and takes up the orders, families, and species of birds and treats of their food habits in systematic order. In this latter part are many useful food-percentage tables.

In such a book as this, one would hardly expect to find much of interest to the mammalogist. However, perusal of the volume shows that there are very few chapters in it that do not contain information about mammals, most of which quite naturally relates to mammals as food for birds, or birds as enemies of mammals, and chapter 12 is devoted entirely to the latter subject. Henderson also briefly discusses the balance of nature, and it is a relief to find an author not professionally an ecologist who grasps the dynamic aspect of this poise. His concepts of such subjects as "sense and sentiment," esthetic value of birds, and conservation are sane, and commend themselves to the mammalogist as well as to the ornithologist. The book is delightfully written and well deserves the attention of all zoologists interested in the interrelationship of birds and mammals.—HARTLEY H. T. JACKSON.

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LIST OF MEMBERS OF THE AMERICAN SOCIETY OF MAMMALOGISTS

(Corrected to October 20, 1927)

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Members

ABBOTT, CLINTON G., Natural History Museum, San Diego, Calif.....1922
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*ABBOTT, DR. WILLIAM LOUIS, Northeast, Md.....Charter
ABEL, PROF. OTHENIO, Palao-biologisches Institut der Univ. Wien, Vienna, Austria.....1925
ABERNATHY, MRS. FRIEDA L., 2226 McGee Ave., Berkeley, Calif.....1926
ACKLAND, MYRON, Rosemary Farms, Monticello, N. Y.....1926
ADAMS, DR. CHAS. C., State Museum, Albany, N. Y.....Charter
ADAMS, MISS ROMOLA M., 912 Linden Ave., Long Beach, Calif.....1926
ADAMS, WILLIAM C., Room 506, State House, Boston, Mass.....1926
ADDISON, RICHARD A., San Simeon, Calif.....1927
AGERSBORG, DR. H. P. KJERSCHOW, James Millikin University, Decatur, Ill.....1921
AHRENS, DR. THEODOR G., Xantener Strasse 21, Berlin-Wilmersdorf, Germany.....1921
AINSWORTH, MAJ. GEN. F. C., 1701 Oregon Ave., N. W., Washington, D. C...1921
ALBRIGHT, DR. HORACE M., Yellowstone Park, Wyo.....Charter
ALBURTUS, MRS. SUSAN S., 29 W. Irving St., Chevy Chase, Md.....1926
ALDOUS, SHALER E. (address unknown).....1927
*ALEXANDER, MISS ANNIE M., Suisun, Calif.....Charter
ALEXANDER, E. GORDON, Central College, Fayette, Mo.....Charter
ALLEN, DR. ARTHUR A., McGraw Hall, Ithaca, N. Y.....Charter
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ALLEN, DR. GLOVER M., Museum of Comparative Zoology, Cambridge, Mass.....Charter
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ANDERSON, EDWIN C., Dell Rapids, S. D.....1923
ANDERSON, DR. RUDOLPH M., National Museum of Canada, Ottawa, Canada.....Charter
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ANDREWS, ROY C., American Museum of Natural History, New York, N. Y.....Charter
ANGELL, WALTER A., 33 Westminster St., Providence, R. I.....1926
ANTHONY, A. W., c/o H. E. Anthony, American Museum of Natural History, New York, N. Y.....Charter
ANTHONY, H. E., American Museum of Natural History, New York, N. Y.....Charter
APGAR, CHARLES S., JR., 325 Orchard Drive, Pittsburgh, Pa.....1927
ARMSTRONG, EDWARD E., 1056 Lonola Ave., Chicago, Ill.....1925
ARMSTRONG, MAJ. NEVILL A. D., West House, Shawnigan Lake, Vancouver Island, B. C.....1925
ARTHUR, STANLEY CLISBY, 6043 Perrier St., New Orleans, La.....1925
ASCHEMEIER, C. R., Florida State Museum, Gainesville, Fla.....Charter
ASHBROOK, FRANK G., U. S. Biological Survey, Washington, D. C.....1922
*ATKINSON, HARRY WATERS, 10 Bishop Road, Guilford, Baltimore, Md....1925
ATKINSON, DR. SPENCER R., 605 Pacific Southwest Bldg., Pasadena, Calif. 1926
AXLEROD, ABRAHAM, 620 Broadway, Buffalo, N. Y.....1927
BABCOCK, DR. HAROLD L., Woodleigh Road, Dedham, Mass.....Charter
BACH, DR. GLENN R., State Capitol Bldg., Olympia, Wash.....1924
BADÉ, DR. WILLIAM FREDERIC, 2616 College Ave., Berkeley, Calif....Charter
BAILEY, ALFRED M., Chicago Academy of Science, Chicago, Ill.....Charter
BAILEY, BERNARD, R. F. D. No. 1, Elk River, Minn.....Charter
BAILEY, FLORENCE MERRIAM, 1834 Kalorama Road, N. W., Washington, D. C.....Charter
BAILEY, H. B., P. O. Box 112, Newport News, Va.....Charter
BAILEY, HAROLD H., 206 Exchange Bldg., Miami, Fla.....Charter
BAILEY, VERNON, 1834 Kalorama Road, N. W., Washington, D. C.....Charter
BAIRD, KATHARINE B., 815 Webster St., N. W., Washington, D. C.....Charter
BAKER, A. B., National Zoological Park, Washington, D. C.....Charter
*BALDWIN, S. PRENTISS, 11025 East Boulevard, Cleveland,Ohio.....1922
BALL, EDWARD M., East Falls Church, Va.....Charter
BALL, WILLIAM H., 1233 Irving St., N. W., Washington, D. C.....1925
BALLOU, DR. W. H., Alpine Road, Closter, N. J.....1926
BANGS, OUTRAM, Museum of Comparative Zoology, Cambridge, Mass....Charter
BANGSON, JOHN S., Berea College, Berea, Ky.....1925
BANNON, ARTHUR H., 1404 Offnere St., Portsmouth, Ohio.....1922
BANNON, HENRY, First National Bank Bldg., Portsmouth, Ohio.....1922
*BARBOUR, DR. THOMAS, Museum of Comparative Zoology, Cambridge, Mass.....Charter
BARNES, CLAUDE T., 359 10th Ave., Salt Lake City, Utah.....Charter
BARRETT, CHARLES H. M., 1339 Valley Place, S. E., Washington, D. C.....Charter
BARTSCH, DR. PAUL, U. S. National Museum, Washington, D. C.....1921

BASCOM, KELLOGG F., Medical College of Virginia, Richmond, Va.....Charter
BASSETT, FRANK N., 91 Merced Ave., San Francisco, Calif.....1921
BATCHELDER, CHAS. F., 7 Kirkland St., Cambridge, Mass.....Charter
BAUMAN, JOHN E., Hotel Pathfinder, Fremont, Nebr.....1923
BEACH, WILLIAM N., 131 E. 46th St., New York, N. Y.....1920
BECK, ROLLO H., R. R. A—288, San Jose, Calif.....Charter
BEEBE, WILLIAM, 33 W. 67th St., New York, N. Y.....Charter
BELL, JAMES F., 2215 Park Ave., Minneapolis, Minn.....1921
BELL, DR. W. B., 803 Rittenhouse St., N. W., Washington, D. C.....Charter
BENSLEY, PROF. B. A., University of Toronto, Toronto, Ontario.....1921
BENSON, JOHN T., Nashua, N. H.....1923
BENT, A. C., Taunton, Mass.....1926
BERGTOLD, DR. W. H., 1159 Race St., Denver, Colo.....Charter
BERMAN, ABRAHAM B., 364 Rutland Road, Brooklyn, N. Y.....1926
BERNARD, JOSEPH F., Loyola University, Montreal, Quebec.....1923
BERRY, ELVERTON C., Box 234, Conway, N. H.....1924
BIBB, DR. J. PORTER, 111 Moulton St., Montgomery, Ala.....1921
BICKNELL, MRS. F. T., 319 S. Normandie Ave., Los Angeles, Calif.....1926
BINGHAM, DR. HAROLD C., Yale University, New Haven, Conn.....1924
BIRD, RALPH D., Birtle, Manitoba.....1926
BISHOP, DR. GEORGE D., Box 153, Albany, Ore.....1924
BISHOP, LOUIS B., 450 Bradford St., Pasadena, Calif.....1927
BISHOP, SHERMAN C., New York State Museum, Albany, N. Y.....Charter
BLAAUW, DR. F. E., Gooilust, Graveland, Hilversum, Holland.....1921
BLACK, PROF. DAVIDSON, Peking Union Medical College, Peking, China
Charter
BLAIN, DR. ALEX. W., 2201 Jefferson Ave., E., Detroit, Mich.....1926
BLAIR, DR. W. REID, N. Y. Zoological Society, New York, N. Y.....1927
BLAKE, PROF. IRVING H., University of Nebraska, Lincoln, Nebr.....Charter
BLANCHARD, DR. FRANK N., University of Michigan, Ann Arbor, Mich....1923
BLINCOE, BENEDICT J., R. 13, Dayton, Ohio.....1926
BLISS, JOHN D., Pozo, San Luis Obispo Co., Calif.....1926
BOESEL, M. W., 415 S. Washington St., New Bremen, Ohio.....1926
BOLT, BENJAMIN F., 225 E. 46th St., Kansas City, Mo.....Charter
BORELL, ADREY E., 2149 Blake St., Berkeley, Calif.....1925
BOWDISH, BEECHER S., Demarest, N. J.....1921
BOYD, GEORGE W., (address unknown).....1925
BOYDEN, DR. ALAN, Rutgers University, New Brunswick, N. J.....1926
BRADSHAW, F., Dept. of Agriculture, Regina, Saskatchewan.....Charter
BRADT, G. W., Michigan State College, East Lansing, Mich.....1927
BRADY, MAURICE K., 3220 17th St., N. W., Washington, D. C.....1924
*BRANDRETH, COURTENAY, Ossining, N. Y.....1921
BRANDRETH, FRANKLIN, Ossining, N. Y.....1921
BRANNON, PETER A., Box 358, Montgomery, Ala.....Charter
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BRIGHT, STANLEY, Cedar Hill Farm, Reading, Pa.....1922
BRIMLEY, C. S., 515 Washington Street., Raleigh, N. C.....Charter

BRIMLEY, H. H., State Museum, Raleigh, N. C.....Charter
BRINKMANN, DR. AUGUST, Bergen Museum, Bergen, Norway.....1921
BRODE, PROF. H. S., 433 E. Alder St., Walla Walla, Wash.....Charter
BRODKORB, PIERCE, 910 Judson Ave., Evanston, Ill.....1926
BROOKS, ALLAN, Okanagan Landing, B. C.....Charter
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BROOKS, FRED E., French Creek, W. Va.....Charter
BROOKS, W. SPRAGUE, 234 Berkeley St., Boston, Mass.....1923
BROWN, BARNUM, American Museum Natural History, New York, N. Y...1926
BROWN, C. EMERSON, Philadelphia Zoological Garden, Philadelphia, Pa..Charter
BROWN, D. E., 87 Lenora St., Seattle, Wash.....Charter
BROWN, E. J., Box 700, Eustis, Fla.....Charter
BROWN, F. MARTIN, St. George's School, Newport, R. I.....1926
BROWN, T. WISTAR, 3rd, 5920 City Ave., Overbrook, Pa.....1924
BROWN, WILLIAM L., U. S. National Museum, Washington, D. C.....Charter
BROWN, WILMOT W., c/o U. S. Consul, Mexico City, District Federale, Mexico.....Charter
BRUNN, CHAS. A., 421 Commerce Bldg., Kansas City, Mo.....Charter
BRYANT, CHARLES A., 65 Market St., San Francisco, Calif.....1926
BRYANT, DR. HAROLD C., Museum of Vertebrate Zoology, Berkeley, Calif.....Charter
BRYANT, WILLIAM L., Park Museum, Providence, R. I.....1922
BUHN, MRS. MINNIE, 3027 60th Ave., Oakland, Calif.....1925
BULL, CHARLES LIVINGSTON, Iradell, N. J.....1926
BULLOCK, D. S., El Verjel, Angol, Chile.....1921
BUMSTEAD, COL. DALE, 149 W. McDowell Road, Phoenix, Ariz.....Charter
BURGESS, THORNTON W., 61 Washington Road, Springfield, Mass.....Charter
BURNETT, WM. L., State Agricultural College, Fort Collins, Colo.....Charter
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BURNS, FRANK L., Berwyn, Pa.....Charter
BURRELL, HARRY, La Mascotte, Doncaster Ave., Kensington, New South Wales, Australia.....Charter
BURRELL, MRS. HARRY (Susan Emily), La Mascotte, Doncaster Ave., Kensington, New South Wales, Australia.....Charter
BURT, WILLIAM H., Museum of Vertebrate Zoology, Berkeley, Calif.....1926
BUSH, H. G., Foxworth-Bush Lumber Co., Mesa, Ariz.....1927
BUTLER, AMOS W., 52 Downey Ave., Irvington, Indianapolis, Ind.....Charter
BUTLER, EDWARD B., 100 Green Bay Road, Hubbard Woods, Ill.....1926
CABOT, WILLIAM B., 447 Marlboro Street, Boston, Mass.....1922
CABRERA, ANGEL, Museo de la Plata, La Plata, Argentina.....Charter
*CADWALADER, DR. W. B., 1206 Medical Arts Bldg., Philadelphia, Pa.....1924
CAHN, DR. ALVIN R., 431A Natural History Bldg., Urbana, Ill.....1921
CALDWELL, GEORGE THORNHILL, University Station, Tucson, Ariz.....1922
CAMP, CAPT. R. D., Brownsville, Texas.....1924
CAMPBELL, DR. J. A., 13 Elm St., Toronto, Ontario.....1920
CAREY, HENRY R., 3115 Queen Lane, Queen Lane Manor, Philadelphia, Pa.....1926
CARLISLE, GEORGE L., JR., 550 Park Ave., New York, N. Y.....1926

CARLSON, C. O., Doane College, Crete, Nebr....1926
CARPENTER, CHARLES K., Baileyville, Ill....1926
CARR, WILLIAM H., American Museum of Natural History, New York, N. Y....1926
CARROLL, JAMES J., 16 Courtland Place, Houston, Texas....1926
CARROLL, DR. MITCHEL, Franklin & Marshall College, Lancaster, Pa....1922
CARTER, HON. GEO. R., 472 Judd St., Honolulu, Hawaii....1927
CARTER, T. DONALD, American Museum of Natural History, New York, N. Y....1922
CASAMAJOR, PROF. L., College of Physicians & Surgeons, 437 W. 59th St., New York, N. Y....1922
CASE, DR. E. C., University of Michigan, Ann Arbor, Mich....Charter
CASH, HARRY A., 420 Hope St., Providence, R. I....1926
CHAMBERLAIN, EDWARD B., 182 Ashley Ave., Charleston, S. C....1923
CHAMBERS, W. LEE, Drawer 123, Eagle Rock, Los Angeles Co., Calif..Charter
CHANDLER, W. L., Michigan Agricultural College, East Lansing, Mich. Charter
CHAPIN, DR. JAMES P., American Museum of Natural History, New York, N. Y....Charter
CHAPMAN, HARRY E., 300 Ridgwood Road, South Orange, N. J....1927
CHARTERS, MISS EMMA M., U. S. Biological Survey, Washington, D. C....1921
CHASE, HENRY B., JR., Natural History Bldg., New Orleans, La....1924
CHASE, DR. WILL, Empress Bldg., Cordova, Alaska....1927
CHEESMAN, WILLIAM H., U. S. Biological Survey, Washington, D. C...Charter
CHRISTY, BAYARD H., 403 Frederick Ave., Sewickley, Pa....1926
CHURCH, MORTON L., Box 1236, Charlotte, N. C....Charter
CLARK, DR. BRUCE L., 202 Bacon Hall, University of California, Berkeley, Calif....Charter
CLARK, ELTON, 18 Post Office Square, Boston, Mass....Charter
CLARK, JAMES T., American Museum of Natural History, New York, N. Y....1926
CLARK, R. F., 209 E. Arizona Ave., Ruston, La....1926
CLARK, WM. O., Framingham Centre, Mass....Charter
CLEAVES, HOWARD H., 1848 Washington Ave., New York, N. Y....1923
CLEMENTS, DR. FREDERIC E., Mission Canyon, Santa Barbara, Calif....1927
COBB, DR. STANLEY, Harvard Medical School, Boston 17, Mass....1922
COCHRAN, MISS DORIS M., U. S. National Museum, Washington, D. C....1925
COCKERELL, PROF. T. D. A., 908 10th St., Boulder, Colo....Charter
*COFFIN, H. E., 2335 First Nat. Bank Bldg., Detroit, Mich....1924
COLE, DR. LEON J., College of Agriculture, University of Wisconsin, Madison, Wis....1922
COLLINS, A. M., A. M. Collins Manufacturing Co., Philadelphia, Pa....1921
COLLINS, DR. HOMER H., University of Pittsburgh, Pittsburgh, Pa....1921
*COLTON, HAROLD S., Box 127, Flagstaff, Ariz....1927
COMSTOCK, MRS. ANNA BOTSFORD, 123 Roberts Place, Ithaca, N. Y....1924
CONGER, PROF. ALLEN C., Ohio Wesleyan University, Delaware, Ohio...Charter
CONOVER, H. BOARDMAN, 6 Scott St., Chicago, Ill....Charter
COOK, MISS FANNYE A., Crystal Springs, Miss....1925

COOK, HAROLD J., Agate, Sioux Co., Nebr.....1925
COOKE, MISS MAY T., 2572 University Place, Washington, D. C.....Charter
COOKMAN, ALFRED, 938 E. Dryden St., Glendale, Calif.....1926
COOLIDGE, DANE, Dwight Way End, Berkeley, Calif.....Charter
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COOLIDGE, JOHN T., JR., Green St., Readville, Mass.....1927
COOLIDGE, PHILIP T., 31 Central St., Bangor, Me.....1927
COOPER, DR. H. C., Abercrombie, N. D.....1926
COOPER, J. P., Rome, Ga.....Charter
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COPELAND, DR. MANTON, Bowdoin College, Brunswick, Me.....Charter
COTTON, DR. SPENCER, 96a Oxford Terrace, Christchurch, New Zealand...1926
COUCH, LEO K., U. S. Biological Survey, State Capitol Bldg., Olympia, Wash.....Charter
COURTNEY, WILBUR D., 321 N. 21st St., Corvallis, Ore.....1920
COWLES, R. B., 116 Oak Ave., Ithaca, N. Y.....1925
CRABB, EDWARD D., University of Pennsylvania, Philadelphia, Pa.....1923
CRANDALL, LEE S., N. Y. Zoological Park, New York, N. Y.....1922
CRAVEN, J. W., 3719 Jenifer St., N. W., Washington, D. C.....Charter
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CRIDDLE, NORMAN, Treesbank, Manitoba.....Charter
CRIDDLE, STUART, Treesbank, Manitoba.....Charter
CRILE, DR. GEORGE W., 2620 Derbyshire Road, Cleveland, Ohio.....1923
CRIMMINS, COL. MARTIN L., Box 83, Fort Sam, Houston, Texas.....1925
CRITCHELL-BULLOCK, CAPT. JAMES, Explorers Club, New York, N. Y.....1926
CROSS, W. REDMOND, 31 Pine Street, New York, N. Y.....1922
CUDAHY, JOHN, 85 Michigan St., Milwaukee, Wis.....1923
CUTLER, DR. IRA E., 2122 S. Clayton, Denver, Colo.....1926
CUYLER, W. KENNETH, 1216 W. 22nd St., Austin, Texas.....1923
DALEY, FLORENCE K., Oliverea P. O., Ulster Co., N. Y.....1927
DAMMERMAN, KAREL WILLEM, Zoological Museum & Laboratory, Buitenzorg, Java.....Charter
DANFORTH, STUART T., Colegio de Agriculture, Mayaquez, Porto Rico....1925
DANIELS, LESLIE B., Colorado Agricultural College, Fort Collins, Colo...1925
DAVENPORT, DR. CHARLES B., Cold Spring Harbor, Long Island, N. Y....1921
DAVIS, R. N., Everhart Museum, Scranton, Pa.....1922
*DAVIS, WILLIAM T., 146 Stuyvesant Place, Staten Island, N. Y.....1922
DAY, ALBERT M., U. S. Biological Survey, Laramie, Wyo.....1924
DE AGUILAR-AMAT, JUAN B., Museo de Ciencias Naturales, Apartado 593, Barcelona, Spain.....1924
DEAN, ROBERT H., 720 Quintard Ave., Anniston, Ala.....1926
DEARBORN, DR. NED, Sacket Harbor, N. Y.....Charter
DECK, RAYMOND S., Childrens Museum, 185 Brooklyn Ave., Brooklyn, N. Y..1926
DEGARIS, DR. CHARLES F., Johns Hopkins Medical School, Baltimore, Md.....1926
DE GROOT, DUDLEY S., (address unknown).....1926
DEICHMANN, ELIZABETH, (address unknown).....1925
DELACOUR, DR. J., Chateau de Cleres, Seine—Inferieure, France.....1926

De Lury, Ralph E., Dominion Observatory, Ottawa, Canada.....1925
DeMille, John B., (address unknown).....1926
Denmead, Talbott, U. S. Biological Survey, Washington, D. C.....1926
Dennison, Henry S., Edmands Road, Framingham Center, Mass.....1922
Dexter, Dr. John S., University of Porto Rico, Rio Piedras, Porto Rico.....Charter
Dice, Dr. Lee R., University of Michigan, Ann Arbor, Mich.....Charter
*Dickey, Donald R., 514 Lester Ave., Pasadena, Calif.....Charter
Dickinson, Joseph E., 409 N. Horsman St., Rockford, Ill.....1926
Dille, Frederick M., Valentine, Nebr.....Charter
Dillehunt, Harry B., Jr., 3333 N. Charles St., Baltimore, Md.....1926
Ditmars, Raymond L., New York Zoological Park, New York, N. Y.....1921
Dixon, Joseph S., Museum of Vertebrate Zoology, Berkeley, Calif....Charter
Donaldson, Dr. Harry J., 410 Pine St., Williamsport, Pa.....1927
Donaldson, Dr. Henry H., The Wistar Institute, Philadelphia, Pa...Charter
Douglas, George M., Lakefield, Ontario.....1923
Doutt, J. Kenneth, Carnegie Museum, Pittsburgh, Pa.....1927
Duff, John R., Public Works Dept., Christchurch, New Zealand.....1925
Dufresne, Frank, Nome, Alaska.....1924
Dunkelberger, Harry W., P. O. Box 6, Flourtown, Montgomery Co., Pa.....1925
Dunn, Prof. E. R., Smith College, Northampton, Mass.....1927
Dunn, Dr. Leslie C., Connecticut Agricultural Station, Storrs, Conn....1921
Dwight, Dr. Jonathan, 43 West 70th St., New York, N. Y.....Charter
Dymond, J. R., Royal Ontario Museum of Zoology, Toronto, Ontario.....1924
Eanes, Robert H., 401 Park Place, Austin, Texas.....1924
East, Charles S., 635 Kenyon St., N. W., Washington, D. C.....1923
Eaton, Prof. E. H., 678 Main St., Geneva, N. Y.....1921
Eaton, Scott H., Box 653, Lawrenceville, Ill.....1925
Eddy, Samuel, Vivarium Bldg., Wright & Healey Sts., Champaign, Ill...1925
Edson, John M., 90 Marietta Road, Bellingham, Wash.....Charter
Éhik, Dr. Julius, Hungarian National Museum, Budapest 80, Hungary..1923
Eifrig, C. W. G., 504 Monroe Ave., Oak Park, Ill.....Charter
Ekblaw, W. Elmer, Box 431, North Grafton, Mass.....1921
Elftman, Herbert, 520 W. 124th St., New York, N. Y.....1926
Elliott, Mrs. Jane S., U. S. Biological Survey, Washington, D. C...Charter
*Ellis, Ralph, Jr., Jericho, Long Island, N. Y.....1926
Elrod, Prof. Morton J., 205 S. 5th St., E., Missoula, Mont.....Charter
Emlen, Arthur C., Awbury, Germantown, Philadelphia, Pa.....1926
Enders, Robert K., Biology Dept., Union College, Schenectady, N. Y...1924
English, Prof. Pennoyer F., A. & M. College, College Station, Texas...1922
English, T. A., 2001 Haste St., Berkeley, Calif.....1924
*Evans, Victor J., Ninth St. & Grant Place, N. W., Washington, D. C..Charter
Evarts, Hal G., Hutchinson, Kan.....1925
Evermann, Dr. Barton W., California Academy of Science, San Francisco, Calif.....Charter
Ewing, H. E., U. S. National Museum, Washington, D. C.....1923
Farley, Jack, 46 S. Broadway, White Plains, N. Y.....1922

FERGUSON, HARRY L., c/o J. & S. Ferguson, 247 Park Ave., New York, N. Y..1922
FERRAR, MAJ. B. B., Supt. Dublin Zoological Gardens, Phoenix Park, Dublin, Ireland.....1927
FESTA, DR. ENRICO, Regiò Museo Zoologico, Palazzo Carignano, (108) Torino, Italy.....1925
FIGGINS, J. D., Colorado Museum of Natural History, City Park, Denver, Colo.....Charter
FINCH, MILFORD L., 1427 N. 24th St., Kansas City, Kan.....1927
FINLEY, WILLIAM L., Jennings Lodge, Ore.....Charter
FISH, DR. HAROLD DUFUR, University of Pittsburgh, Pittsburgh, Pa.....1924
FISHER, ARTHUR H., 7140 Cresheim Road, Mt. Airy, Philadelphia, Pa.....1921
FISHER, DR. A. K., 1236 11th St., N. W., Washington, D. C.....Charter
FISHER, DR. G. CLYDE, American Museum of Natural History, New York, N. Y.....Charter
FLEMING, J. H., 267 Rusholme Road, Toronto, Ontario.....Charter
FLOWER, MAJ. S. S., Tring, Herts, England.....1921
FLOYD, CHARLES B., 454 Wolcott St., Auburndale, Mass.....1926
FOLLETT, RICHARD E., 2134 Dime Bank Bldg., Detroit, Mich.....1926
FOLLETT, WILBUR I., 3621 Broadway, Oakland, Calif.....1927
FOSTER, FRANCIS A., Edgartown, Mass.....1922
FOSTER, FRANK B., P. O. Box H, Haverford, Pa.....1926
FOSTER, GOODWIN LEB., 1124 Keeler Ave., Berkeley, Calif.....1926
FOSTER, JOHN H., P. O. Box H, Haverford, Pa.....1927
FOX, DR. HERBERT, Zoological Society of Philadelphia, Philadelphia, Pa..1927
FRASER, DR. CHARLES M., University of British Columbia, Vancouver, B. C.....1921
FRENCH, JAMES G., 3628 Saanich Road, Victoria, B. C.....1926
*FRICK, CHILDS, Roslyn, Lond Island, N. Y.....Charter
FRIEL, ARTHUR O., 726 Ocean Ave., Brooklyn, N. Y.....1927
FRIESSER, JULIUS, Field Museum of Natural History, Chicago, Ill.....1924
FRYXELL, F. M., Dept. of Geology, University of Chicago, Chicago, Ill...1925
*FUGUET, HOWARD, Bullitt Bldg., Philadelphia, Pa.....1925
FULLER, ARTHUR B., 2717 Euclid Ave., Cleveland, Ohio.....Charter
FULLER, HENRY C., 3704 Huntington St., Washington, D. C.....1926
FULTON, HARRY L., (address unknown).....1925
FURLONG, PROF. E. L., University of California, Berkeley, Calif.....1925
GABRIELSON, IRA N., 515 Post Office Bldg., Portland, Ore.....Charter
GAGLE, ROY H., U. S. Forest Service, Great Falls, Mont.....1924
GAILLARD, PROF. C., Museum des Sciences Naturelles, Boulevard des Balges 28, Lyon, France.....1925
GAMMAGE, ECTOR R., Westlake, La.....1927
GANDER, FRANK F., P. O. Box 395, East San Diego, Calif.....1927
GARLOUGH, F. E., 2024 Channing Way, Berkeley, Calif.....Charter
GARRETSON, M. S., 3703 Willett Ave., New York, N. Y.....1921
GAULT, BENJAMIN T., 424 S. Main St., Glenellyn, Du Page Co., Ill....Charter
GAUSEBECK, A. T., 60 Broadway, New York, N. Y.....1926
GHIGI, PROF. ALESSANDRO, University of Bologna, Bologna, Italy.....1926
GIANINI, CHARLES A., Poland, N. Y.....Charter

GIDLEY, DR. JAMES W., U. S. National Museum, Washington, D. C...Charter
GIFFORD, DR. H., 3636 Burt St., Omaha, Nebr.....1926
GIGNOUX, CLAUDE, 73 Tunnel Road, Berkeley, Calif.....1926
GILBERT, J. C., 137 Ash St., Wayne, Mich.....1926
GILMAN, M. FRENCH, Banning, Calif.....Charter
GILMORE, DR. MELVIN R., Museum of the American Indian, Broadway at 155th St., New York, N. Y.....Charter
GILMORE, RAYMOND M., (address unknown).....1926
GILPIN, F. ROBERT, 1212 S. 57th St., West Philadelphia, Pa.....Charter
GLENN, DONALD, Franklin, Pa.....1926
GLOYD, HOWARD KAY, Kansas State Agricultural College, Manhattan, Kan.....1922
GOELITZ, WALTER A., 22 Nunda Blvd., Rochester, N. Y.....1926
GOLDMAN, MAJ. E. A., U. S. Biological Survey, Washington, D. C... Charter
GOLDMAN, LUTHER J., Box 416, Gooding, Idaho.....1922
GOLDSMITH, G. W., Carnegie Institution of Washington, 123 E. Washington St., Colorado Springs, Colo.....1922
GOLDSMITH, DR. WM. M., Southwestern College, Winfield, Kan.....1924
GOODRICH, OSBORN, JR., W. O. Goodrich Co., Hopkins St., Milwaukee, Wis.....1924
GOODWIN, GEO. G., American Museum of Natural History, New York, N. Y.....1921
GOWANS, MISS ETHEL, 308 S. Lincoln St., Kent, Ohio.....1925
GRAHAM, EDWARD H., Carnegie Museum, Pittsburgh, Pa.....1925
GRAHAM, MAXWELL, Chief, Wild Life Division, Northwest Territories & Yukon Branch, Ottawa, Canada.....1922
GRANGE, WALLACE, B., Ladysmith, Wis.....1923
GRANGER, WALTER W., American Museum of Natural History, New York, N. Y.....Charter
GRANT, CLEVE, 433 Washington Ave., Lorain, Ohio.....1926
GRANT, E. R., 2101 16th St., N. W., Washington, D. C.....1923
*GRANT, MADISON, 101 Park Ave., New York, N. Y.....Charter
GRANT, U. S., IV, (address unknown).....1926
GRAVES, DR. WILLIAM W., Metropolitan Bldg., Saint Louis, Mo.....1921
GRAY, A. E., 1021 Manzano Court, Albuquerque, N. Mex.....1924
GREEN, PROF. GEORGE R., 250 S. Burrowes St., State College, Pa.....1925
GREEN, HAROLD T., Academy of Natural Sciences, Philadelphia, Pa.....1927
GREEN, MORRIS M., 39 S. Wyoming Ave., Ardmore, Pa.....1924
GREGORY, S. S., JR., 105 S. LaSalle St., Chicago, Ill.....1927
GREGORY, TAPPAN, 19 S. LaSalle St., Chicago, Ill.....1925
GREGORY, DR. WILLIAM K., American Museum of Natural History, New York, N. Y.....Charter
GRIEPENTROG, ELMER, R. R. 5, Box 146, Salem, Ore.....1926
GRINNELL, DR. GEORGE BIRD, 238 E. 15th St., New York, N. Y.....Charter
GRINNELL, DR. JOSEPH, Museum of Vertebrate Zoology, Berkeley, Calif.....Charter
GRINNELL, MRS. JOSEPH, 3016 Benvenue Ave., Berkeley, Calif.....1923

GROSVENOR, GILBERT, Hubbard Memorial Hall, 16th & M Sts., N. W., Washington, D. C.....1921
GUEST, MRS. MARJORIE L., Box 476, Jamestown, N. Dak.....1925
GYLDENSTOLPE, COUNT NILS, Naturhistoriska Riksmuseum, Stockholm 50, Sweden.....Charter
HAAGNER, DR. ALWIN KARL, National Zoological Gardens of South Africa, Box 754, Pretoria, Union of South Africa.....Charter
HAGERUP, H., Gothersgade 30, Copenhagen, Denmark.....Charter
HAGNER, DR. FRANCIS R., 1824 19th St., N. W., Washington, D. C.....1925
HAIGHT, SHERMAN P., 61–63 Worth St., New York, N. Y.....Charter
HALL, E. RAYMOND, Museum of Vertebrate Zoology, Berkeley, Calif.....1923
HALL, DR. F. GREGORY, Duke University, Durham, N. C.....Charter
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HALL, NELSON E., Glacier National Park, Belton, Mont.....1924
HAMILTON, W. J., JR., Cornell University, Ithaca, N. Y.....1924
HANAWALT, PROF. F. A., Otterbein College, Westerville, Ohio.....1925
HANKINSON, THOMAS LEROY, 96 Oakwood Ave., Ypsilanti, Mich..... Charter
HANSEN, MISS DORA, 2138 I St., N. W., Washington, D. C.....1925
HANSON, DR. KARL B., U. S. Experimental Fur Farm, Saratoga Springs, N. Y.....1921
HARDISTY, ARTHUR H., Shelburne, Vt.....Charter
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HARKIN, J. B., Commissioner of Dominion Parks, Dept. of Interior, Ottawa, Canada.....Charter
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HARRIS, COLEMAN J., Mont Alto, Franklin Co., Pa.....1925
HARRIS, HARRY, 5234 Hermosa Ave., Eagle Rock, Calif.....Charter
*HARRIS, WILLIAM P., JR., 15410 Windmill Point Drive, Grosse Pointe Parks, Mich.....1924
HARRISON, DR. BRUCE M., University of Southern California, Los Angeles, Calif.....1927
HARRISON, GEORGE L., 1520 Locust St., Philadelphia, Pa.....Charter
HART, CECIL, 132 N. 3rd St., Montebello, Calif.....1925
HARTMAN, DR. CARL, Johns Hopkins Medical School, Baltimore, Md.....1921
HASKIN, JENNINGS N., Potomac Park Apt. 812, Washington, D. C.....1926
HATT, ROBERT T., New York University, University Heights, New York, N. Y.....1921
HAVEN, HERBERT M. W., 500 Forest Ave., Portland, Me.....Charter
HAWK, PROF. GROVER C., Penn College, Oskaloosa, Iowa.....1923
HAWORTH, M. M. ALICE, Maple Lane, Edgeworth, Sewickley, Pa.....1927
HAY, DR. OLIVER P., U. S. National Museum, Washington, D. C.....1921
HELLER, EDMUND, Field Museum of Natural History, Chicago, Ill.....Charter
HELLMAN, DR. MILO, 40 E. 41st St., New York, N. Y.....1921
HELME, ARTHUR H., Miller Place, Suffolk Co., N. Y.....Charter
HENDERSON, ARCHIBALD DOUGLAS, Belvedere, Alberta.....Charter
HENDERSON, JUNIUS, 1305 Euclid St., Boulder, Colo.....Charter
HENDERSON, WALTER C., 8 Magnolia Parkway, Chevy Chase, Md.....Charter

HENNINGER, REV. W. F., % Hubach Products Co., Tiffin, Ohio.....1921
HERRERA, DR. A. L., Dirección de Estudios Biológicos, 7a Balderas 94, Mexico, D. F., Mexico.....1923
HERRICK, HAROLD, 95 Maiden Lane, New York, N. Y.....1926
HIGGINS, A. WHITMAN, R. F. D. 23, Highland St., Rock, Mass.....1926
HILL, ALBERT E., 509 Valle Vista Ave., Oakland, Calif.....1927
HILL, DR. EBER C., Johns Hopkins Medical School, Baltimore, Md.....1926
HILL, MRS. HOWARD G., 329 Summit Ave., Redlands, Calif.....1926
HILZHEIMER, DR. MAX, Markischer Platz 2, Markisches Museum, Berlin S-14, Germany.....1925
HINE, PROF. JAMES S., Ohio State University, Columbus, Ohio.....1926
HISAW, PROF. FREDERICK L., University of Wisconsin, Madison, Wis..Charter
HOADLEY, HON. GEORGE, Edmonton, Alberta.....1927
HOBSON, EDWIN CHARLES, c/o F. A. Greeley, Pelham, N. H.....Charter
HODGES, CHARLES H., JR., Grosse Pointe, Mich.....1927
HODGES, WETMORE, Beverly Farms, Mass.....1927
HOLLAND, DR. W. J., Carnegie Museum, Pittsburgh, Pa.....Charter
HOLLING, HOLLING C., Field Museum of Natural History, Chicago, Ill....1925
HOLLISTER, MRS. MABEL P., 1819 Ontario Place, N. W., Washington, D. C.....1925
HOLLISTER, WARREN D., Delavan, Wis.....Charter
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HOLMES, C. R., E. Valley Road, Santa Barbara, Calif.....1926
HOLT, ERNEST G., Carnegie Museum, Pittsburgh, Pa.....Charter
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HOPKINS, A. D., Kenawha Farms, Mineral Wells, W. Va.....1926
HORNADAY, DR. WM. T., New York Zoological Park, New York, N. Y..Charter
HORNE, I. S., 924 Loew's State Bldg., Los Angeles, Calif.....1923
HÓRRING, H., Mag. scient., Zoologist Museum, Copenhagen, Denmark....1924
HORSFALL, R. BRUCE, 1214 16th St., N. W., Washington, D. C.....Charter
HOUSE, E. J., 55 Fidelity Bldg., Pittsburgh, Pa.....1926
HOUSHOLDER, VIC. H., (address unknown).....1925
*HOWELL, A. B., U. S. National Museum, Washington, D. C.....Charter
HOWELL, ARTHUR H., 2919 South Dakota Ave., Washington, D. C.....Charter
HOY, DR. WILLIAM E., JR., Presbyterian College of South Carolina, Clinton, S. C.....1922
HUARD, REV. DR. V. A., 2 Richelieu St., Quebec, Quebec.....1922
HUBBACK, THEODORE R., Sunlaws, Bukit Kota, Kuala Lipis, Pahang, Federated Malay States.....1922
HUBER, DR. ERNST, Johns Hopkins Medical School, Baltimore, Md.....1922
HUBER, DR. G. CARL, 1330 Hill St., Ann Arbor, Mich.....1927
HUBER, WHARTON, Academy of Natural Sciences, Philadelphia, Pa.....1922
HUESTIS, R. R., University of Oregon, Eugene, Ore.....1927
HUEY, LAURENCE M., Museum of Natural History, Balboa Park, San Diego, Calif.....Charter
HUGHES, GEORGE T., Box 153, Plainfield, N. J.....1926
HUGHES, RICHARD CHESTER, Tecumseh, Okla.....1921
HUNGATE, PROF. J. W., State Normal School, Cheney, Wash.....1925

HUTCHINSON, CONSTANT E., 2nd, Phoenix Bank, Phoenix, N. Y.....1924
INGEBRIGTSEN, LEKTOR OLAF, Kathedralschule, Bergen, Norway.....1925
JACKSON, PROF. C. F., University of New Hampshire, Durham, N. H.....1921
JACKSON, DR. HARTLEY H. T., U. S. Biological Survey, Washington, D. C.....Charter
JACKSON, MRS. HARTLEY H. T., 1855 Calvert St., N. W., Washington, D. C.....Charter
JACKSON, RALPH W., Route 1, Cambridge, Md.....1921
JACOBSEN, WILLIAM C., 1341 43rd St., Sacramento, Calif.....Charter
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JAEGER, EDMUND C., 1462 W. 6th St., Riverside, Calif.....1921
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JAQUES, F. L., American Museum of Natural History, New York, N. Y...1925
JAY, ANTONIN, 1622 Pennsylvania Ave., Los Angeles, Calif.....1927
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JOHNSON, PROF. GEO. E., State Agricultural College, Manhattan, Kan.....Charter
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JOHNSON, M. S., University Farm, St. Paul, Minn.....1923
JOHNSON, DR. PAUL B., 3208 17th St., N. W., Washington, D. C.....1924
JONES, COL. E. LESTER, U. S. Coast & Geodetic Survey, Washington, D. C.....Charter
JONES, GEORGE N., 1901 45th St., S. W., Seattle, Wash.....1927
JONES, PROF. LYNDS, 352 W. College St., Oberlin, Ohio.....1926
JONES, ROBERT F., Longfellow Zoological Gardens, Minnehaha Falls, Minneapolis, Minn.....Charter
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KAIN, CONRAD, Wilmer, B. C.....1923
KALMBACH, E. R., U. S. Biological Survey, Washington, D. C.....1925
KEAYS, J. E., 328 St. George St., London, Ontario.....1924
KEEFER, MISS MARY B., 605 Wallace Ave., Covington, Ky.....1926
KELLOGG, C. C., 269 S. Greenwood Ave., Pasadena, Calif.....1925
KELLOGG, REMINGTON, U. S. Biological Survey, Washington, D. C....Charter
KENAGY, DR. F. H., Rupert, Idaho.....1927
KENG, LIM BOON, University of Amoy, Amoy, China.....1927
KENNARD, FRED H., Dudley Road, Newton Centre, Mass.....1922
KENYON, DR. WALTER A., Hamline University, St. Paul, Minn.....1925
KIDDER, NATHANIEL T., Milton, Mass.....1921
KING, DR. BENJAMIN H., 1215 Lake Shore Drive, Coeur d'Alene, Idaho...1922
KIRKHAM, PROF. WILLIAM B., 100 Mill St., Springfield, Mass.....Charter
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KLOSS, C. BODEN, Raffles Museum, Singapore, Straits Settlements....Charter
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KNAPP, MISS THELMA, 726 N. 24th St., St. Joseph, Mo.....1923
KOOKER, T. H., Realty Bldg., Jacksonville, Fla.....1925
KURODA, DR. NAGAMICHI, Fukuyoshi Cho, Akasaka, Tokyo, Japan....Charter
LADD, DR. WILLIAM S., 254th St. & Independence Ave., New York, N. Y..1922
LA DUE, HARRY J., St. Peter, Minn.....1927
LAMPMAN, BEN HUR, 18 E. 84th St., N., Portland, Ore.....1926
LANDBERG, ROBERT L., 4672 Sherman St., Denver, Colo.....1927
LANDSTEINER, KARL, Rockefeller Institute, 66th St. & Ave. A, New York, N. Y.....1927
LANE, DR. H. H., University of Kansas, Lawrence, Kan.....Charter
*LANG, HERBERT, American Museum of Natural History, New York, N. Y.....Charter
LANGE, D., Mechanical Arts High School, St. Paul, Minn.....Charter
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LAW, J. EUGENE, Box 247, Altadena, Calif.....Charter
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LEFFINGWELL, DR. D. J., State College, Pullman, Wash.....1923
LEIGHTON, ALEXANDER H., 11 Alexander St., Princeton, N. J.....1924
LEISTER, C. W., McGraw Hall, Ithaca, N. Y.....Charter
LETL, FRANK H., Sublette, Ill.....1927
LEWIS, JOHN B., Lawrenceville, Va.....1926
LEWIS, MERRIAM G., Lexington, Va.....1926
LEWIS, DR. NOLAN D. C., St. Elizabeths Hospital, Washington, D. C.....1927
LIGON, J. STOKLEY, Box 350, Santa Fe, N. Mex.....Charter
LINCOLN, FREDERICK C., U. S. Biological Survey, Washington, D. C...Charter
LINDGREN, DR. HOMER D., New York University, New York, N. Y.....1927
LINSDALE, JEAN, 1818 Milvia St., Berkeley, Calif.....1921
LIPPOLD, BENJAMIN F., 15 Park Row, New York, N. Y.....1927
LITTLE, DR. CLARENCE C., 815 S. University Ave., Ann Arbor, Mich.....1927
LITTLE, LUTHER, 1400 Wayne Ave., South Pasadena, Calif.....Charter
LITTLE, MALCOLM E., New York University, New York, N. Y.....1925
LLOYD, HOYES, 406 Queen St., Ottawa, Canada.....Charter
LOCKE, S. B., Forest Service, Ogden, Utah.....1923
LOCKWOOD, DUNBAR, 205 Richdale Ave., Cambridge, Mass.....1926
LOFTFIELD, GORM, (address unknown).....Charter
LONGMAN, HEBER A., Queensland Museum, Brisbane, Queensland, Australia.....1925
LÖNNBERG, DR. EINAR, Naturhistoriska Riksmuseum, Vetenskapsakademien, Stockholm 50, Sweden.....Charter
LOOMIS, PROF. F. B., 8 Orchard St., Amherst, Mass.....1926
LOOMIS, LEE J., 110 E. Franklin St., Union, N. Y.....1927
LORING, JOHN ALDEN, Owego, Tioga Co., N. Y.....Charter
LOWE, PROF. JOHN N., Normal College, Marquette, Mich.....1925
LYMAN, STORRS H., P. O. Box 473, Dayton, Wash.....Charter

*Lyman, Prof. Theodore, Jefferson Physical Laboratory, Harvard University, Cambridge, Mass.....1921
Lyon, Dr. M. W., 122 N. Lafayette Boulevard, South Bend, Ind.....Charter
Lyon, William I., 811 N. Sheridan Road, Waukegan, Ill.....1925
MacIntyre, Miss Etta L., 1820 Bushnell Ave., Pasadena, Calif.....1927
Macko, Harry A., 935 Meadow Ave., Charleroi, Pa.....1923
Macnamara, Chas., Arnprior, Ontario.....1927
MacReynolds, Geo., 76 E. State St., Doylestown, Pa.....1923
Madison, Harold L., Cleveland Museum of Natural History, Cleveland, Ohio.....Charter
Magee, M. J., 603 South St., Sault Ste. Marie, Mich.....1925
Mailliard, Jos., 1815 Vallejo St., San Francisco, Calif.....Charter
Mallinckrodt, Edward, 16 Westmorland Place, St. Louis, Mo.....1922
Mann, Dr. Wm. M., National Zoological Park, Washington, D. C.....1926
Mannhardt, Prof. L. A., Explorers Club, New York, N. Y.....1924
Manning, John S., 211 N. Lexington Ave., Pittsburgh, Pa.....1926
Marburger, Clifford, Denver, Pa.....1926
Marcotte, L'Abbe Leon, Seminaire St. Charles, Sherbrooke, Quebec.....1925
Marden, Aaron, Eagle Island, South Harpswell, Me.....1926
Marland, Ernest W., P. O. Box 1286, Ponca City, Okla.....1927
Marshall, Alfred, Montrose, Baldwin Co., Ala.....1926
Marshall, Dr. E. Kennerly, Jr., Johns Hopkins Medical School, Baltimore, Md.....1927
Marshall, H. R., P. O Box 154, Wilson, N. C.....1926
*Matthew, Dr. Wm. D., University of California, Berkeley, Calif.....Charter
May, Franklin H., (address unknown).....1925
McCampbell, Sam C., Zoological Dept., State Agricultural College, Fort Collins, Colo.....1924
McClintock, Norman, 504 Amberson Ave., Pittsburgh, Pa.....Charter
McCoy, Frank J., Santa Maria Inn, Santa Maria, Calif.....1925
McDaniel, Geo. H., 234 W. Pratt St., Eureka, Calif.....1926
McGregor, James H., Colombia University, New York, N. Y.....1927
McGregor, Richard C., Bureau of Science, Manila, P. I.....Charter
McGuire, J. A., Outdoor Life, Denver, Colo.....Charter
McIlhenny, Edward A., Avery Island, La.....Charter
McKechnie, Dr. Wm. C., 751 Granville St., Vancouver, B. C.....1927
McKnight, L. P., Forest Service, Gardiner, Mont.....1927
McLain, Robert B., P. O. Box 132, Hollywood, Calif.....Charter
McLellan, A. H., 309 San Francisco St., El Paso, Texas.....1925
McLellan, Miss Mary E., 945 Pine St., San Francisco, Calif.....1926
Medsger, Oliver P., 9 Columbia Ave., Arlington, N. J.....1920
Meek, M. W., 447 S. Hewitt St., Los Angeles, Calif.....1924
Merriam, Dr. C. Hart, 1919 16th St., N. W., Washington, D. C.....Charter
Merriam, Dr. John C., Carnegie Institution of Washington, Washington, D. C.....Charter
Merriam, Lyman L., 56 S. Highland Ave., Ossining, N. Y.....1925
Mershon, Wm. B., Saginaw, Mich.....1925
Messer, Harold M., 6 Adele Place, Baldwin, N. Y.....1926

METCALF, DR. FRANKLIN P., Fukien Christian University, Foochow, China.....Charter
METCALF, PROF. Z. P., North Carolina State College, Raleigh, N. C...Charter
MIDDLETON, DR. AUSTIN R., University of Louisville, Louisville, Ky.....1921
MILLER, FREDERIC W., 935 S. Gaylord St., Denver, Colo.....1921
MILLER, GERRIT S., JR., U. S. National Museum, Washington, D. C...Charter
MILLER, DR. LOYE H., Southern Branch, University of California, Los Angeles, Calif.....Charter
MILLER, MISS MARY MARTHA, 40 E. 55th St., Kansas City, Mo.....1923
MILLER, DR. ROBERT C., University of Washington, Seattle, Wash.....1925
MILLER, PROF. SHIRLEY P., Institute of Anatomy, University of Minnesota, Minneapolis, Minn.....Charter
MILLS, DAVID C., 242 W. 30th St., New York, N. Y.....1926
MILLS, ERNEST M., Fernald Hall, Amherst, Mass.....1927
MILLS, WM. C., 181 E. 15th Ave., Columbus, Ohio.....1927
MITCHELL, H. HEDLEY, Provincial Museum, Regina, Saskatchewan.....1923
MOODY, PAUL A., Williams Science Hall, Burlington, Vt.....1923
MOORE, A. W., 204 Atlas Bldg., Salt Lake City, Utah.....1921
MOORE, ROBERT T., 1420 E. Mountain St., Pasadena, Calif.....1926
MORDEN, WM. J., 29 S. LaSalle St., Chicago, Ill.....1925
MORGAN, DR. ANN, Mount Holyoke College, South Hadley, Mass.....Charter
MORRIS, WM. E., 908 Thatuna St., Pullman, Wash.....1927
MORTON, DR. DUDLEY J., 169 Cold Spring St., New Haven, Conn.....1926
MOSELEY, PROF. E. L., State Normal College, Bowling Green, Ohio...Charter
MOTOHASHI, DR. HEIICHIRO, Imperial College of Agriculture, Tottori, Japan.....1924
MOUNTS, MRS. BERYL T., Ballard Normal School, Macon, Ga.....1926
MUMA, ROBERT J., Ilderton, Ontario.....1927
MUNROE, RALPH M., Cocoanut Grove, Fla.....1922
MURIE, ADOLPH, 219 S. 7th Ave., Moorhead, Minn.....1924
MURIE, O. J., Jackson, Wyo.....Charter
MURRAY, T. B., P. O. Box 602, Pocatello, Idaho.....1927
NAUMBURG, MRS. WALTER H., Davis Farm, New Canaan, Conn.....1922
NELSON, CARDBURT, (address unknown).....1926
NELSON, DR. E. W., U. S. Biological Survey, Washington, D. C.....Charter
NEWBEGIN, EDWARD K., 62 Sparks St., Cambridge, Mass.....1926
NEWBY, W. W., Dept. of Zoology, Iowa State College, Ames, Iowa.....1926
NEWSOM, WM. M., 228 E. 61st St., New York, N. Y.....1926
NICHOLS, JOHN T., American Museum of Natural History, New York, N. Y.....Charter
NOBLE, DR. G. K., American Museum of Natural History, New York, N. Y.....1926
NORTON, ARTHUR H., Museum of Natural History, Portland, Me.....Charter
OBERHOLSER, DR. HARRY C., 2805 18th St., N. W., Washington, D. C. Charter
ODERKIRK, GALEN C., Dept. of Entomology, Purdue University, Lafayette, Ind.....1927
O'DONOGHUE, PROF. CHAS. H., University of Manitoba, Winnipeg, Manitoba.....Charter

OEHSER, PAUL H., U. S. Biological Survey, Washington, D. C.....1926
OGDEN, DR. H. V., 141 Wisconsin St., Milwaukee, Wis.....Charter
OGNEV, DR. S. I., University Zoological Museum, Leningrad, U. S. S. R..1924
OKKELBERG, PROF. PETER, 1116 Ferndon Road, Ann Arbor, Mich.....Charter
OLIVER, W. R. B., Dominion Museum, Wellington, New Zealand.....1924
ORTEGA, JAMES L., Yountville, Calif.....1925
OSBORN, CHASE S., 601 Adams Bldg., Sault Ste. Marie, Mich.....1925
OSBORN, DR. HENRY FAIRFIELD, American Museum of Natural History, New York, N. Y.....Charter
OSBORN, WILLIAM P., 48 Benedict Ave., Tarrytown, N. Y.....1927
OSGOOD, DR. WILFRED H., Field Museum of Natural History, Chicago, Ill.....Charter
OVER, WM. H., University of South Dakota, Vermillion, S. Dak.....1924
PALMER, L. J., Reindeer Experiment Station, Fairbanks, Alaska.....1927
PALMER, DR. T. S., 1939 Biltmore St., N. W., Washington, D. C.....Charter
PARKER, ALFRED E., Lincoln Park Zoological Garden, Chicago, Ill.....1923
PARKER, HARRY C., Museum of Natural History, Lawrence, Kan.....1927
PARKER, DR. GEO. H., 16 Berkeley St., Cambridge, Mass.....Charter
PARKER, WESLEY D., Sullys Hill National Preserve, Fort Totten, N. Dak.....1926
PARRISH, MORRIS L., Dormy House, Clementon, N. J.....1921
PARTELLO, COL. J. M. T., 3248 Washington St., San Francisco, Calif.....1925
PAYNE, EUGENE H., Marquette University School of Medicine, Milwaukee, Wis.....1925
PEARSE, DR. A. S., Duke University, Durham, N. C.....1927
PEARSON, T. GILBERT, 1974 Broadway, New York, N. Y.....Charter
PELLEW, MISS MARIAN I., Box 455, Aiken, S. C.....1926
PENNOCK, CHAS. J., Kennett Square, Pa.....1921
PERKINS, PROF. E. H., Box 52, Waterville, Me.....1922
PERKINS, JAMES H., 22 William St., New York, N. Y.....1927
PERRIGO, WATSON M., U. S. National Museum, Washington, D. C.....1926
PERSING, ELLIS C., Cleveland School of Education, Cleveland, Ohio.....1927
PETERS, JAMES L., Lane End, Harvard, Mass.....Charter
PHELPS, FRANK M., 128 Cedar St., Elyria, Ohio.....1926
PHILLIPS, FRANK, Bartlesville, Okla.....1926
*PHILLIPS, DR. JOHN C., Wenham, Mass.....Charter
PHILLIPS, JOHN M., 2227 Jane St., Pittsburgh, Pa.....Charter
PICKENS, A. L., Furman University, Greenville, S. C.....1926
PICKING, LT. COMDR. SHERWOOD, Bureau of Ordnance, Navy Dept., Washington, D. C.....1927
PICKWELL, GAYLE B., Dept. of Zoology, Northwestern University, Evanston, Ill.....1926
PIERCE, WRIGHT M., Box 343, Claremont, Calif.....1926
PIERSON, PROF. CHAS. J., College Park, Md.....Charter
PITCHER, MRS. ISABEL V. S., Route 3, Box 384, Hayward, Calif.....1926
POOLE, ARTHUR J., U. S. National Museum, Washington, D. C.....Charter
POOLE, E. L., Reading Public Museum, Reading, Pa.....1922
POPE, DR. ALTON S., 1308 E. 56th St., Chicago, Ill.....Charter

POPE, CLIFFORD H., American Museum of Natural History, New York, N. Y. 1924
POPE, GUSTAVUS D., 1020 Ford Bldg., Detroit, Mich. 1924
POPE, PROF. PHILIP H., U. S. Veterans Hospital 85, Walla Walla, Wash. 1921
POUGH, RICHARD H., 4 Lenox Place, St. Louis, Mo. 1927
POWERS, DR. LILLIAN D., White Plains, N. Y. ..... Charter
*PRATT, HON. GEO. D., Pratt Institute, Brooklyn, N. Y. ..... Charter
PRATT, DR. HENRY S., Haverford College, Haverford, Pa. 1924
PREBLE, EDWARD A., U. S. Biological Survey, Washington, D. C. ..... Charter
PREENE, FRANK H. E., 3045 Villa Ave., New York, N. Y. 1927
PRINGLE, MISS CORNELIA C., 1816 Vallejo St., San Francisco, Calif. 1926
RACEY, KENNETH, 3262 First Ave., Vancouver, B. C. 1925
RADOSAVLJEVICH, PAUL R., New York University, New York, N. Y. 1927
RAMSDEN, DR. CHARLES T., P. O. Box 146, Guantanamo, Cuba ..... Charter
RAUCH, WM. P., 15 E. 48th St., New York, N. Y. 1927
RAVEN, HENRY C., American Museum of Natural History, New York, N. Y. ..... Charter
RAWSON, CHARLES I., Oxford, Mass 1925
RAYNES, GEO. W., 209 Miller Ave., Portsmouth, N. H. 1926
REED, MISS BESSIE P., 2635 Reagan St., Dallas, Texas 1926
REED, ERVIN E., Monticello, Iowa 1925
REED, MEREDITH P., 216 N. 3rd St., Vincennes, Ind. 1927
REHN, JAMES A. G., Academy of Natural Sciences, Philadelphia, Pa. ..... Charter
REID, RUSSEL, 210 Thayer St., Bismarck, N. D. ..... Charter
RENO, C. E., (address unknown) 1924
RETT, EGMONT Z., Museum of Natural History, Santa Barbara, Calif. 1924
RICE, JAMES H., Wiggins, S. C. 1922
RICH, DR. GUY C., 1820 El Cerrito Place, Hollywood, Calif. 1922
RICHMOND, DR. CHAS. W., U. S. National Museum, Washington, D. C. ..... Charter
RICHTER, DR. CURT P., Johns Hopkins Hospital, Baltimore, Md. 1924
RIDGWAY, JOHN L., Los Angeles Museum, Los Angeles, Calif. 1926
RIDGWAY, ROBERT, Olney, Ill. 1927
RIDSDALE, P. S., 1214 16th St., N. W., Washington, D. C. 1926
RIIS, PAUL B., 301 Shaw St., Rockford, Ill. 1926
RILEY, J. H., U. S. National Museum, Washington, D. C. ..... Charter
*RINDSFOOS, WM., Brunson Bldg., Columbus, Ohio ..... Charter
RITTER, WM. E., Dept. of Biology, University of California, Berkeley, Calif. 1926
ROBB, WALLACE, H., 80 Highland Ave., Belleville, Ontario 1925
ROBERTS, AUSTIN, Transvaal Museum, Pretoria, South Africa ..... Charter
ROBERTS, H. D., Villa Nova, Pa. 1925
ROBERTS, DR. T. S., Zoological Museum, University of Minnesota, Minneapolis, Minn. ..... Charter
ROBERTSON, HOWARD, 157 Wilton Drive, Los Angeles, Calif. ..... Charter
ROBERTSON, PROF. W. R. B., University of Missouri, Columbia, Mo. 1922
ROBINSON, JAMES B., (address unknown) 1923
ROBINSON, HON. T. D., Mohawk, N. Y. 1924

ROBINSON, COL. WIRT, U. S. Army, West Point, N. Y.....1921
ROGERS, ALBERT C., Colorado Museum of Natural History, Denver, Colo.....Charter
ROGERS, CHAS. H., Museum of Zoology, Princeton, N. J.....Charter
ROGERS, WALLACE, 173 Hurt St., N. E., Atlanta, Ga.....1926
ROHLFS, STERLING, Vermejo Park, N. Mex.....1927
ROIGNEAU, MARCELLE, American Museum of Natural History, New York, N. Y.....1927
ROOSEVELT, KERMIT, Explorers Club, New York, N. Y.....Charter
ROOSEVELT, THEODORE, Oyster Bay, N. Y.....1925
ROPSHAW, DR. H. J., 5901 Woodland Ave., Cleveland, Ohio.....1923
ROS, J. PABLO, Independencia 150, Cienfugos, Cuba.....1921
ROSS, ROLAND C., 388 Dearborn St., Pasadena, Calif.....1925
ROTHROCK, BOYD P., Pennsylvania State Museum, Harrisburg, Pa.....Charter
*ROTHSCHILD, LORD LIONEL WALTER, Zoological Museum, Tring, Herts, England.....Charter
ROTNOUR, MISS ALVA B., 707 Hazel Ave., Ellwood City, Pa.....1926
ROWAN, PROF. WM., University of Alberta, Edmonton, Alberta.....1921
ROWLEY, JOHN, Los Angeles Museum, Los Angeles, Calif.....Charter
RUSH, W. M., Forest Service, Livingston, Mont.....1925
RUSSELL, C. P., Yosemite National Park, Calif.....1927
RUST, HENRY J., Box 683, Coeur d'Alene, Idaho.....1922
SALVESEN, SIGVALD, Aamli, near Arendal, Norway.....1927
SAMPSON, W. B., 1005 N. San Joaquin St., Stockton, Calif.....1924
SAMPSON, W. F., 215 Market St., San Francisco, Calif.....1927
SANBORN, COLIN C., Field Museum of Natural History, Chicago, Ill.....1924
SANDERSON, W. E., Fayetteville, N. Y.....1927
SANS, EDWARD R., 450 Gazette Bldg., Reno, Nev.....Charter
SANTENS, JOSEPH A., American Museum of Natural History, New York, N. Y.....1921
SANTENS, R. H., Carnegie Museum, Pittsburgh, Pa.....1925
SAUNDERS, ARETAS A., 48 Longview Ave., Fairfield, Conn.....Charter
SAUNDERS, W. E., London, Ontario.....Charter
SAVAGE, J., 1048 Ellicott Square, Buffalo, N. Y.....1925
SAVIN, WM. M., 52 Broadway, New York, N. Y.....1925
SAWYER, E. J., Yellowstone Park, Wyo.....1924
SCALON, V. N., (Boulovarnaja N30) Universite, Tomsk, Sibirie, U. S. S. R..1927
SCHEAR, PROF. E. W. E., 107 W. Park St., Westerville, Ohio.....1922
SCHEFFER, THEO. H., Puyallup, Wash.....Charter
SCHMIDT, F. J. W., Stanley, Wis.....1927
SCHMIDT, KARL P., Field Museum of Natural History, Chicago, Ill.....1925
SCHMITT, DR. WALDO L., U. S. National Museum, Washington, D. C...Charter
SCHOONMAKER, WALTER J., State Museum, Albany, N. Y.....1924
SCHORGER, A. W., 2021 Kendall Ave., Madison, Wis.....1924
SCHULTE, PROF. H. VON W., Creighton University College of Medicine, Omaha, Nebr.....Charter
SCHULTZ, DR. A. H., Dept. of Anatomy, Johns Hopkins Medical School, Baltimore, Md.....Charter

SCHWARZ, DR. E., Zoologisches Museum, Berlin N. 4, Germany.....1925
SCHWARZ, FRANK, 1809 Lafayette Ave., St. Louis, Mo.....Charter
SCOLLICK, JOS. W., 4124 New Hampshire Ave., N. W., Washington, D. C. Charter
SCOTT, PROF. JOHN W., University of Wyoming, Laramie, Wyo.....1925
SEFTON, JOS. W., JR., San Diego, Calif.....1925
*SETON, ERNEST THOMPSON, Greenwich, Conn.....Charter
SETON, HENRY, 428 Memorial Drive, Cambridge, Mass.....1924
SHADLE, PROF. ALBERT R., University of Buffalo, Buffalo, N. Y.....1925
SHAMEL, H. H., U. S. National Museum, Washington, D. C.....1923
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SHERMAN, MISS ALTHEA R., National, via McGregor, Iowa.....Charter
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SILVER, JAMES, U. S. Biological Survey, Washington, D. C.....Charter
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SLAUTTERBACK, J. J., State Game Commission, Harrisburg, Pa.....1926
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SNYDER, FRANKLIN F., Medical School, University of Rochester, Rochester, N. Y.....1926
SNYDER, HARRY, 1603 Bell Bldg., Chicago, Ill.....1925
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WALKER, BRYANT, 1306 Dime Bank Bldg., Detroit, Mich.....1924
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WALTERS, LEON L., Field Museum of Natural History, Chicago, Ill....Charter
WANG, DR. GING H., Institute of Psychology, Sun Yat Sen University, Canton, China.....1927
WARD, HENRY L., Kent Scientific Museum, Grand Rapids, Mich.....Charter

WARREN, EDWARD R., 1511 Wood Ave., Colorado Springs, Colo.....Charter
WARTHIN, ALDRED S., JR., 1020 Ferdon Road, Ann Arbor, Mich.....1926
WAY, IVAN M., 809 Harrison St., Denver, Colo.....1926
WEBER, LOUIS, 4740 Mascher St., Philadelphia, Pa.....1927
WEBSTER, E. B., Port Angeles, Wash.....1922
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WEED, PROF. LEWIS H., Dept. of Anatomy, Johns Hopkins Medical School, Baltimore, Md.....1921
WEESE, PROF. A. O., Dept. of Zoology, University of Oklahoma, Norman, Okla.....Charter
WEGEFORTH, DR. HENRY M., 210 Maple St., San Diego, Calif.....1923
*WEHRHANE, HENRY H., Llewellyn Park, Orange, N. J.....1924
WEISEMANN, T. WALTER, (address unknown).....1926
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WETMORE, DR. ALEXANDER, U. S. National Museum, Washington, D. C. Charter
WEYDEMEYER, WINTON W., Fortine, Mont.....1927
WHEATON, RODGER G., 316 Jackson Bldg., Asheville, N. C.....1926
WHELEN, MAJ. TOWNSEND, 3231 Garfield St., Washington, D. C.....1924
WHITAKER, ARTHUR, Museum of Birds and Mammals, Lawrence, Kan. ...1926
WHITE, ERIC P., Eldridge, Mont.....1926
*WHITE, FRANCIS BEACH, Saint Pauls School, Concord, N. H.....Charter
WHITE, HENRY L., Belltrees, Scone, N. S. W., Australia.....1924
WHITE, THEODORE E., Museum of Birds and Mammals, Lawrence, Kan...1926
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WHITNALL, PROF. HAROLD O., Colgate University, Hamilton, N. Y....Charter
WHITNEY, ALVIN G., School of Forestry and Conservation, University of Michigan, Ann Arbor, Mich.....Charter
WIDMANN, OTTO, 5105 Enright Ave., St. Louis, Mo.....Charter
WIGHT, PROF. H. M., 258 Campus Ave., Ames, Iowa.....1921
WILDER, H. E., Carlotta, Calif.....Charter
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WILLIAMS, MERTON Y., University of British Columbia, Vancouver, B. C. Charter
WILLIAMS, OWEN L., 1228 Garfield St., Lincoln, Nebr.....1927
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WINTON, PROF. W. M., Texas Christian University, Fort Worth, Texas...1922
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WITTLINGER, MISS BERTHA, State Teachers College, Harrisonburg, Va.....1926
WOLFE, L. R., Fort Douglas, Salt Lake City, Utah 1923
WOOD, DR. C. H., 656 N. Vista Bonita, Glendora, Calif.....1925
WOOD, DR. CASEY A., 7 W. Madison St., Chicago, Ill.....1924
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WOOD-JONES, PROF. FREDERIC, University of Adelaide, Adelaide, South Australia.....1921
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WORKS, WINFIELD F., 1818 Newton St., N. W., Washington, D. C.....1927
WORTHINGTON, WM. A., Annville, Jackson Co., Ky.....1926
WRIGHT, DR. A. H., Cornell University, Ithaca, N. Y.....Charter
WRIGHT, DR. SEWALL, Dept. of Zoology, University of Chicago, Chicago, Ill.....Charter
WULSIN, FREDERICK R., 124 Brattle St., Cambridge, Mass.....1927
WYMAN, DR. L. C., Boston University School of Medicine, Boston, Mass. Charter
WYMAN, LUTHER E., Los Angeles Museum, Los Angeles, Calif.....Charter
WYTHE, MISS MARGARET W., Museum of Vertebrate Zoology, Berkeley, Calif.....Charter
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ZIMMER, JOHN T., Field Museum of Natural History, Chicago, Ill.....Charter

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COMMENT AND NEWS

The likeness of Paul Matschie that accompanies the article by Doctor Schwarz in this number of the JOURNAL is an enlargement from a photograph of a group of vertebrate zoologists attending the Sixth International Zoological Congress, Berne, Switzerland, August, 1904. It was taken at Interlaken on August 19. Gerrit S. Miller, Jr., who contributes this illustration, says that the posture is a specially characteristic one, and that he has often seen Matschie, in his laboratory at the Berlin Museum, sitting in this position beside a large table covered with skulls of chimpanzees or gorillas, discoursing on the problems of great ape taxonomy.

Predatory-animal control work has recently been inaugurated in Alaska, under an agreement between Governor Parks and the U. S. Biological Survey. R. K. Stewart, of the Biological Survey, formerly assistant leader of predatory-animal control in California, has been detailed to Alaska as leader to study predatory-animal conditions there and to develop and demonstrate suitable methods for controlling these animals, particularly wolves and coyotes, which prey upon wild game and livestock to a serious degree. In coöperation with the Alaska Game Commission, trappers and other persons will be instructed in the control methods developed by the Biological Survey.

The Carnegie Institution of Washington has granted funds for Dr. F. B. Sumner to continue his investigations on genetics in *Peromyscus* at the Scripps Institution of Oceanography, La Jolla, California. During the past summer, Doctor Sumner spent some two months studying the *Peromyscus polionotus* group in the field in Florida and Alabama.

The price of volumes 2 and 5 of the JOURNAL will be advanced December 1.

The annual meeting of the American Society of Mammalogists will be held April 4 to 7, 1928, at the U. S. National Museum, Washington, D. C. As this is the tenth such meeting, it would be fitting if the members would make an especial effort to attend.

During the past summer two Pacific Coast sportsmen have on as many occasions hired whaling boats and with parties of invited guests have fared forth shunting. A large whale was procured each time but it was, of course, impossible to utilize the animals in any way and the carcasses were turned adrift. If it becomes fashionable for such wealthy gentry to pursue the remnant of our cetacean population that the commercial whalers have left, the future of the larger species presents a picture that is indeed gloomy.

The production of fur-bearing animals in Alaska is to be studied under a cooperative agreement recently made between Gov. George A. Parks, of Alaska, and the U. S. Biological Survey. Dr. Earl Graves, a veterinarian and a graduate of Kansas State Agricultural College, has been selected to conduct the work. He will study the problems incident to the production of fur for commercial purposes, and advise fur farmers of Alaska in matters pertaining to the breeding and care of fur-bearing animals and the prevention and cure of diseases among them.

The City Service Commission of Milwaukee is about to hold an examination for the position of director of the Milwaukee Zoological Garden. Information may be obtained by writing to Herbert W. Cornell, Secretary, City Service Commission, City Hall, Milwaukee, Wisconsin.

The U. S. Department of Agriculture is coöperating with the University of Minnesota in studies of contagious diseases of foxes. Dr. Robert Green, of the Medical School, with the aid of other scientists, has been conducting both field and laboratory investigations of outbreaks of disease on fox ranches. Upon information furnished the Agricultural Appropriations Committee of the United States House of Representatives by members of the American National Fox Breeders Association, Congress increased the appropriation to the Department of Agriculture, effective July 1, 1927, to permit expansion of the work of the Biological Survey on contagious diseases of fur animals. Dr. Joseph E. Shillinger, formerly employed by the Bureau of Animal Industry, was put in charge of this work on August 16, 1927, and another specialist will be assigned to assist him at an early date. Wherever possible these representatives will visit ranches where outbreaks occur and advise on the control of diseases. They also will obtain material for laboratory study and conduct research work to determine when possible the cause of disease.

In an address on the subject "Protection of Wild Life in Switzerland and the Swiss National Park," delivered before the South African Biological Society on November 20, 1926, Dr. Carl Schröter made the following statement, upon which

Americans might well deliberate: "Shooting, fishing, manuring, grazing, and woodcutting are entirely prohibited. No flower nor twig may be gathered, no animal killed and no stone removed; even the fallen tree must remain untouched. Nature alone is dominant! No hotels are allowed to be erected, and, naturally, no routes for motor cars. The whole must conserve an alpine character. Camping and the lighting of fires is prohibited. How different are the American national parks! There, big hotels are erected, automobile routes are constructed, and camping, even fishing is allowed. The American national parks are pleasure resorts, our national park, a 'Nature Sanctuary.'"

The outlook for American wild life, though none too bright, is not entirely black, as is indicated by a recent decision made by Col. William B. Greeley, chief of the U. S. Forest Service, whereby a permit was refused a commercial company to construct an inclined cableway to the summit of Mount Hood, Oregon, with rest rooms and lunch rooms at the top, and midway stations. Colonel Greeley said the material gains in tourist traffic would fail to compensate for the loss in esthetic and sentimental value of such an outstanding natural feature, if it were subjected to commercial development. A recent survey of the national forests has disclosed that approximately one-third of the acreage could still be classed as wilderness, and that if the proposed Forest Road System, as at present planned on paper, were 100 per cent completed, there would still be 52,920 roadless square miles, exclusive of Alaska.

A law approved March 11, 1927, by Gov. John G. Richards of South Carolina, and which took effect September 1, reads as follows: Be it enacted by the General Assembly of the State of South Carolina: That it shall be unlawful for any person, firm, or corporation to set, sell, make or use a steel trap or any like device within this State. *Provided*, That the provisions of this Act shall not apply to any person setting a steel trap within two hundred yards of his residence or within twenty-five yards of any poultry house, which is set for the protection of his property, nor shall the same apply to merchants who have steel traps for sale outside of this State. Any person, firm or corporation violating the provisions of this Act shall be guilty of a misdemeanor and shall upon conviction be punished by a fine of not more than one hundred dollars nor less than twenty-five dollars, or imprisonment for not more than thirty days, for each offense.

An informal meeting of local members of the American Society of Mammalogists was called at the Museum of Vertebrate Zoology, Berkeley, on the evening of August 2, 1927, to hear and discuss an address by Dr. Theodore Sherman Palmer, on the subject of "Problems of Big Game Conservation." Those attending represented the California Fish and Game Commission, the California Academy of Sciences, the United States Biological Survey, and the departments of zoology and paleontology in the University of California. This meeting was so successful as again to raise the question of establishing a Pacific coast branch of the society.

One year ago this month news was flashed of the death of Carl Ethan Akeley,—explorer, artist, sculptor, inventor, naturalist, and conservationist, who died in

camp on Mount Mikeno, Belgian Congo, November 17, 1926. The JOURNAL OF MAMMALOGY might well devote many columns to a man who has done so much for mammalogy, but we yield to NATURAL HISTORY, published by the American Museum of Natural History, the institution for which he spent his last years. The March-April issue of this magazine, the Akeley Memorial number, contains several articles that reflect the sentiment of the American Society of Mammalogists.

Louis Agassiz Fuertes, famous portrait painter of birds and enthusiastic ornithologist, was almost instantly killed and his wife injured when their roadster was struck by a train at Potters Crossing, near Unadilla, New York, August 22, 1927. Mr. Fuertes was born February 7, 1874, at Ithaca, New York, where he spent his boyhood, was graduated from Cornell University, married, made his home, and lies at rest. Although known chiefly as a bird artist and ornithologist, he maintained an interest in mammals and was a charter member of our society. He produced several excellent portraits of mammals, particularly for the U. S. Biological Survey, among the more noteworthy being those of a plateau wild-cat and of a ring-tailed cat, reproduced in North American Fauna 25. He also painted the originals for all of the many colored plates in E. W. Nelson's "The Larger North American Mammals" and "The Smaller North American Mammals," published in the National Geographic Magazine, November, 1916, and May, 1918, respectively. As to the excellence of these it is only necessary to remark that none of his bird portraits surpasses them. Mr. Fuertes was loved and respected by all who came in contact with him. His inspiring personality, his wit and humor, and his sympathetic interest, won him many friends. His personality will be missed even more than his art.

The August number of the JOURNAL addressed to Prof. E.-L. Trouessart, Museum d'Histoire Naturelle, Paris, was returned marked "décédé." The date of his death is unknown to us. Professor Trouessart was an honorary member of the American Society of Mammalogists. He was widely known through his "Catalogus Mammalium," and his passing takes an important figure from international mammalogy.

Word has been received of the death of Dr. C. Kerbert, director of the Koninklijk Zoologisch Genootschap, Natura Artis Magistra, Amsterdam, at the age of 78 years.

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Vol. 8 NOVEMBER, 1927 No. 4

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Published Quarterly by the American Society of Mammalogists

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Incorporated April 29, 1920

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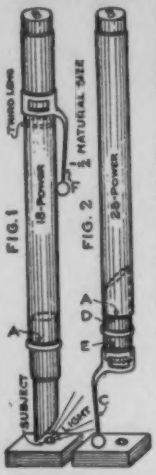

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